RAILROAD GAZETTE

FRIDAY, DECEMBER 26.

The Locomotive Engineer's New Year's.

The following is a translation of a story by the late Baron M. M. von Weber, who in his preparation for his profession as an engineer served for a year on a locomotive:

It was New Year's eve in the locomotive engineer's room at the engine-house in the German town of Birglitz An old locomotive engineer, retired on a pension, was brewing a bowl of punch at the table, which in honor of the New Year was spread with a clean cloth. In from the cold, snowy air entered a number of locomotive runners wrapped up to their eyes, covered with snow, puffing and stamping.

"Bad weather for running this New Year's," said the new comers, shaking off the snow and stripping off overcoats, wraps, jackets, caps and overshoes.

"Little do you know, nowadays, of bad weather for running an engine; in the glass parlors that the companies have built over your foot-boards, on engines that rock you on their springs as a nurse rocks a child in its arms. You ought to have stood with me about 1839 and 1840 on the little engines that ran so hard and pitched so that you felt every rail joint from sole to crown, and that couldn't stir when the snow was ankle deep over the rails. And there we stood night and day, with no sign of shelter except our overcoats and furs, through December storms and July heats, and in hail storms. That was tough work! What do you know about it? And for that matter, what is your hardest work compared to what Hennig has had to go through to-day to finish up his year, in standing his examination for locomotive engineer. In the open air the engine God is with us; but, in the school-room, there is the Devil. But here comes the boy that has been running the gauntlet. Hurrah for him!"

Six hoarse voices repeated the welcome, and six right hands were stretched toward the young man in his black Sunday suit, with blushing, open countenance, and with that clear, far gaze in his blue eyes which is peculiar to sailors and locomotive engineers, who entered, somewhat hesitatingly, and answered their greeting.

"Now how did you get through? Did they make it hot for you? Did the master mechanic try your eyes?"

"Let's sit down and have our punch," said the engineers, as they gathered round him.

"Keep still now," said Zimmermann, the old retired engineer. "You shall have no punch until Hornig and Frank come in with the freight train. The telegrapher told me it was 20 minutes behind time, and it must have got here by this time."

"Well," said the young candidate, wiping off the sweat which the bare recollection of his experience caused to stand on his brow, "they tortured me fearfully. I was examined according to the new regulations. A row of gentlemen a rod long sat around me, not one of whom, except our Master Mechanic, had I ever seen on a locomotive or in a shop. And our foremen were not the worst ones. They questioned me very sharply, to be sure, but you could understand them and give them sensible answers. But I didn't understand more than half of what the other examiners—learned men in high positions—asked me. They didn't talk railroad language, and what they wanted to know I had only learned out of the books the foreman had lent me, just for the purpose of passing the examination. I never had come across them in practice and had never used them, and probably never will as long as I live."

"And what were they?" a comrade began to ask, lighting his cigar, when the door of the room suddenly opened and in poured a cloud of snow, out of which emerged two new arrivals, the engineers of the belated freight trains.

"Just in time," was the cry; "now pass round the punch, and send to the restaurant for the New Year's Eve dinner."

"Here is some game to add to it," said one of the new comers, holding up a half-roasted rabbit by the hind legs.

"When did you get that; what is the matter of it?"

"The little fellow was going to dish himself up for the feast, but was in a little too much of a hurry, and got roasted with his skin on," said the owner of the rabbit. The red light on my engine scared him out of his hiding place in the snow, and he began running a race with the train. For two or three minutes I saw the little fellow by the light of my fire flying over the snow alongside the engine, on the other track. I gave a short whistle, which scared him so that he ran ahead, gave a leap, got under the red light of the lamps, which probably blinded him, and then doubled in front of the engine as he would in front of a dog, across the track. I looked out to see if he would come in sight again, but he did not, and I supposed he had been run over or passed by, and forgot him. But when they were cleaning out my grate at Seestadt, the fellow with the poker called up from the ash-pit, "Hornig, Hornig, you have brought a roast with you!" I thought the man must be crazy and got down and looked. As sure as I am sitting here there lay my rabbit of the Biglitz woods in my ash-pan dead and half cooked. The ash-pan must have caught him as he was making a jump. He must have been in a hurry to get roasted."

The story of the young engineer was received with loud laughter.

"Laugh away over the poor beast," growled Zimmermann, filling the glasses again meanwhile. "You don't know how bad it feels to lie under a fire-box."

"And do you know how it feels?" said several voices in tones indicating great doubt.

"I know all about it, as you fellows very well know, and I have gone through all the experience there can be between the bottom of the rails and the top of the smokestack," answered Zimmermann.

"But you never have been in the ash-pan?" said his companions.

"Not quite," answered the old engineer very gravely, "but *under* it, and part of me pretty nearly in it, too. But I tell you I have been where a fine train of handsome cars, full of jolly people, in a moment—before you could lift your hand to the whistle or put on a brake—was turned into a heap of kindling wood and pieces of bolts, axles and wheels, out of which came groans and cries for help, and around which people cried in despair. I have been where locomotives leapt like kittens off the rails, down the bank, and rolled over two or three times, wheels in air, smoke-stack under, and everything was all steam, ruins, fire, hissing and screaming. I have been through all this, but in thirty-five years of railroading my heart never stood quite so still as it did under the ash-pan."

"Tell us all about it, Father Zimmermann," called a chorus of voices, whose tones showed that they were accustomed to make themselves heard above the rattling and clattering of the engine.

"Well, well, I will, although I hate to talk about it," he answered, as he slowly untied his tobacco pouch and began to fill his short pipe. "Something thumps hard here under my third rib whenever I think about it."

"You see, boys, the hands that embroidered this tobacco pouch came near becoming a widow's hands, and my Carl and Julie would never have been born, if you could have called me 'Big Frank' then as you do now."

"How so, Father Zimmermann?"

"Just light your stylish cigars—they suit you fellows in glass cabs, just as the short pipes used to suit us sturdy fellows in the open air—and hand back your glasses. Then hold your tongues till I get through.

"On New Year's Eve in the year 1845, full thirty years ago, it was terrible weather, as it is to-day—drifting snow and driving sleet. I was the junior runner at the main station in our city, and had only lately been married. You know the station is a miserable place for running. Which ever way the wind blows it catches you there. The road enters the city through a narrow cutting, and one of the two tracks always gets blocked before the snow has been blowing an hour. Just beyond the cutting, in the third house on Gardner street, behind the old oil mill, which we cursed so often because we had to cut off steam on passing for fear the sparks might set the shingle roof on fire. Just behind this mill I lived with my Louise and my eldest boy Frank, who is now foreman in Rudrich's shops.

"So on New Year's Eve in 1845 I came in from Griesthal with a heavy freight train, having been standing 14 hours on the engine, with the thermometer near zero and the snow and sleet blowing. I was stiff with cold, and was anticipating enjoying my New Year's punch. It was getting dark when I came in, and through the falling snow I saw the station with its hundreds of lights on the platforms and switches, as if it were a great Christmas festival. Sorry cheer was there for me! On account of the Christmas holidays some five hundred cars had collected at the station, and they all had to be made up into trains in order that they might be returned immediately after New Year's.

"Hardly had I got off my engine in the round-house when the yard-master came up and said: 'Zimmermann, Hauser has been taken sick. You will have to take the third switching engine in his place.' 'Jerusalem,' said I, 'but I hope it won't take till midnight, Yard-master; I must be home by that time, or the new year will be unlucky.'"

"'Nonsense,' said the Yard-master; 'you stick to it until you get through,' and away he went through the snow.

"I took it to heart more than it deserved, but the chill which came over me when I came out with the engine I ascribed to the fearful storm that blew in my face. The whole air was full of powdery snow and cold mist, and when the white gusts drove across the track I could hardly see the smoke-stack.

"Of the lamp signals you could only get now and then a glimpse of red, white or green; and of the horn and mouth whistle* signals, what with the howling of the wind among the cars and the singing of the telegraph wires and the rolling of the cars and the whistling of the engines, you could hear only just enough to be sure that you didn't understand them. Of the Yard-master's calls you could understand absolutely nothing except that he was calling.

"In the midst of this some two hundred cars were being pushed in every direction at the same time by three different engines; everywhere they emerged like great shadows from banks of mist and snow, and then disappeared again, and the deep snow deadened it all; you could not hear them pass nor come nor go. The poor switchmen and yardmen sprung back and forth between the moving cars, wet to the skin, knee-deep in the snow. You know pretty well how a drilling yard looks in a winter night! It is a special Providence that men are not all crushed to atoms, and all my life I have wondered that I have not heard every other morning of some one's being killed. And when anything happens, the high and mighty gentlemen get around a green table in a warm room, and take the Book of Rules out of their pockets! Well, so it goes, and so it will; but if they would just once in their lives go *outside* and look on, they might learn something.

"So it was a bad night then, and perhaps some of the boys were anxious to get to their New Year's punch, for the drilling was done in a terrible hurry. The cars fairly flew back and forth, and the lights passed by like lightning, and everywhere was the creaking and rattling of the buffers as they came together, and the men crept under and between the cars as if the wheels were ginger cakes and the buffers feather pillows. Prominent among them was a little, ugly Drill-master's helper—I never could bear the fellow, for he once cut me out when I was courting—but I had to wonder at his activity when I saw his signal lanterns everywhere, swinging round, across, up, down, forward and back, and heard his sharp voice calling through the storm.

"I had just called to this man when I saw him dodge between two cars again. I told him he ought not to be so devilishly reckless in such weather, when he could hear nothing and see nothing, and moreover might slip down any time. But he laughed in my face and shouted back, 'You mind your own business, Zimmerman, and not me. We must get through before midnight—go ahead,' and away he went. 'Go to the devil,' I shouted after him, and these words I shall not forget as long as I live, and shall repent them on my dying bed."

Here the old engineer paused, wiped his forehead, took a draught from his punch glass, and then continued:

"I heard him again call out 'Ease ahead' to my comrade, heard the safety chains rattling, and then a sound—like what? Did you ever hear a butcher cut through a big bone with an axe? Then I heard a stifled scream, and then again the clatter and rattle of the buffers coming together. A cold chill ran through my bones. Then I got the signal to run forward, and there was no delay. I was soon far from that place at the other end of the yard, where no one could know what had happened.

"But now I did my work as if I were dreaming, and when half an hour later we were through, and I ran back into the engine-house, the foreman said to me: 'Do you know, Zimmermann, that the Drill-master's helper Porges has been killed—crushed between the buffers?' I did not ask many questions—my heart sunk in me, and how I took care of the engine and got started for home I don't know. As I passed the station platform I saw a crowd standing with lanterns and something lying on the snow covered with a cloak. I had no questions to ask about it; I trembled like a leaf, and I can tell you, boys, I don't know what I would not have given if I had not called to him half an hour before to go to the devil. It was a hard task to drive that out of my head, though it was not so ill meant—a way of talking that we rough fellows got into the habit of.

With you young fellows it is still worse, and it would cure you if you had felt the remorse that I felt then. Well, finally I succeeded in getting my mind on the bright, warm room at home, with the felt slippers and Louise and the baby and the cat and the tea-kettle singing on the stove, and the bottle of arrack and the sugar bowl and the lemons on the table, and gradually I could see it all plainly.

"You may imagine that I did not pay much attention to wind or weather or road with all this thinking, and I only noticed that the wind was still whirling and blowing, as I walked into the cutting near the old oil mill, through which I could have seen the window in my house if I could have seen anything ten paces off that night. I was walking on the right-hand track, because it was clear of snow, and because I could see my house from it first.

"I went along quite confidently, for I was coming from the station, and you know I was walking on the track for the trains coming in, so no train could run on me from behind, and in front none was to be expected; moreover, I would have heard it coming.

"When I was about half-way through the cutting, which, as you know, is on a curve, and in which I couldn't see a car's length that night, I heard a whistling behind me, and immediately afterward the click, clack of the wheels of a slowly approaching train, as they struck the rail joints. I knew by the sound that the engine was pushing the train ahead of it, for the sound of the exhaust was much further back than the sound of the wheels. Thinks I, that must be the reserve train of about ten cars which was standing on the track in front of the station, and which they are now pushing over to the freight depot. All this passed through my mind dimly, just as a man always thinks mechanically of his work, even when his head and heart are full of other things. I said to myself, it is nothing to me anyway, for the train must pass by me on the left-hand track. But as the ping, pang of the wheels on the hard frozen track had come close to me and I could hear the rattling of the safety-chain on the front baggage car, and saw how the light of the signal lamp slipped toward me on the snow, I turned my head to call out 'Happy New Year!' to the boys on the engine.

"But there was no train on the track on that side, and at that very moment I felt a mighty push against my back. My eyes saw stars; I lay flat on my face on the track, and—ping—pang—the cars began to go over me."

Here the old engineer paused again. It was still as death in the engineers' room; with eyes wide open, bent forward, pale, the strong faces of the young enginemen surrounded the table. Again he filled the glasses, pushed down the tobacco in his pipe, and continued:

"You see, boys, when we are sitting around the table here, or standing on the engine, or even when we are going through an examination, as poor Hennig did to-day, then the thoughts come out of our thick skulls one after another, slowly, in order, and 'acording to the regulations;' we can observe and greet every one of them; indeed, the master mechanics often say that we enginemen think slower than other people, because all the quickness in us has gone into our engines. But, boys, in that moment which happened between my push and my falling flat on my face I did more thinking than I ever did at any other time between Easter and Whit Sunday.

"First I thought of home, the warm room and everything in it, and the New Year's bell-ringing, and the New Year's church in the morning—well, we won't speak about that; then on the Drill-master's helper, who was lying under a cloak on the snow, and then I calculated concerning the train that was running over me as clearly as if I had it to make up. Why was it coming up the wrong track, in which I had walked—the down track? And immediately I understood what I had forgotten in my reverie while walking home. At noon I had seen the up track covered deep with snow, and that was why the train went out on the in track. Then I plainly saw the train standing; there could not be more than ten or eleven freight cars in it, all our company's cars; they were all high above the rails; they would do me no harm—I was lying flat enough between the rails. But the engine, the ash-pan of the engine? The three engines that still had steam up at the station I knew as well as my tobacco box, the 'Wittekind' would pass over me harmless even if I had been larger than I was then; the 'Herrmann' also, perhaps, might be merciful to me, if it didn't carry too much coal and water, and if the gravel ballast on which I was lying were not too thick; but under the 'Sirius,' one of the new, low-built elephants, I would be a dead man—worse than a dead man, a man slowly torn to pieces and crushed. Now, which engine was it that was coming?

"All this, you see, boys, I had thought out between the push and the fall, but when once I was lying down all calculating ceased, and I only stretched myself out instinctively, and drew in my breath and made myself as thin as a board, and counted the axles that passed over my head. Every ping and pang spoke out plain syllables which sounded like: 'A wretched death—a wretch—ed death.' And now something heavy catches me; no, it is nothing yet; it only slips and slides rattling over me lengthwise, feeling cold on my neck; it is a coupling chain hanging down. But now it comes; the ground begins to trembie under me, first gently, then more and more violently; very slowly it comes; then I saw on one side, though I had my head pressed down in a hollow, that the rail and the snow and the rolling wheels passing me were lighted with a red light that kept getting brighter and brighter; that was the engine fire shining through the ash-pan. Now I felt it getting hot on my bare head and neck. The ties sunk down; the rails cracked and bent; the ground shook violently under me; there, there it is! And immediately it caught me heavily on the back, pressed forward—God have mercy! then rip, tear, something on me tore in two—and puff, puff, rolling, thundering and stamping, the engine had passed over me. The ground was still trembling behind it. From the sky above the snow again was falling on me.

"How I ever got on my feet again I cannot say. There I stood and trembled and saw the red lights of the engine disappear in the curve, looking to me like the eyes of Death himself.

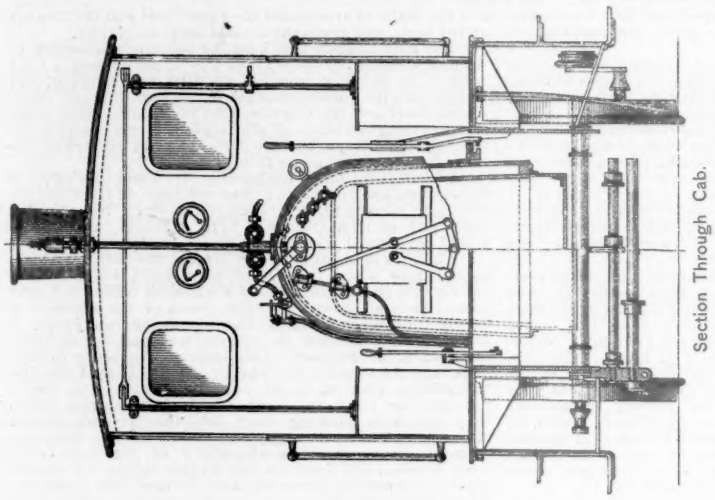
"Then I felt myself all over to find what the engine had torn off from my body, and found that the two regulation buttons were missing from the back of my uniform overcoat. I went to the nearest switchman and borrowed a lantern, and looked up the buttons in the snow. But when we were at home sitting around the punch bowl, in which sometimes I put too much spirits and sometimes too much sugar, Louise, amazed, said to me. Husband, what is the matter of you to-night. You are all trembling and don't say a word; and then my senses and speech came back to me, and I showed Louise the buttons and told her the story and said, holding the buttons between my fingers: 'See there, your husband was only so far from a terrible death this evening.' Look; I have the two buttons here and will carry them on me till death comes in earnest."

The old engineer unbuttoned his coat and took out two buttons bearing the arms of the King, which he carried on a cord over his rough breast.

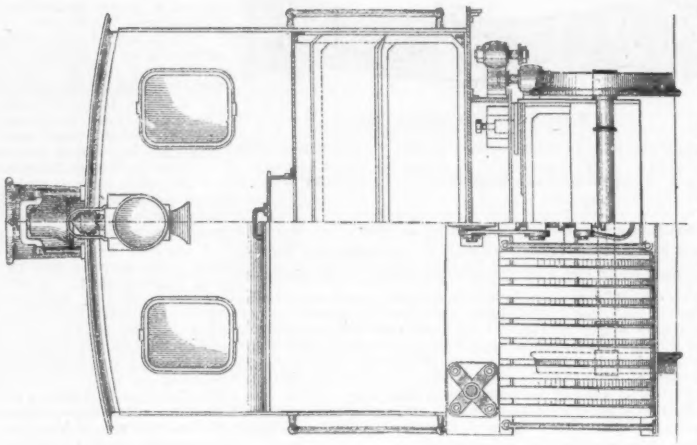
"And now you know why I pitied the poor creature in the ash-pan. I have told you the story, because the talk led to it; otherwise I do not like to talk about it; I felt the death agony then, and no Christian likes to call that to mind. Don't let it weaken your courage. You will need that in the New Year as in the old one.

"Hark! It is just striking twelve. Happy New Year to you boys, and prosperous trips for many hundred thousand more locomotive miles!"

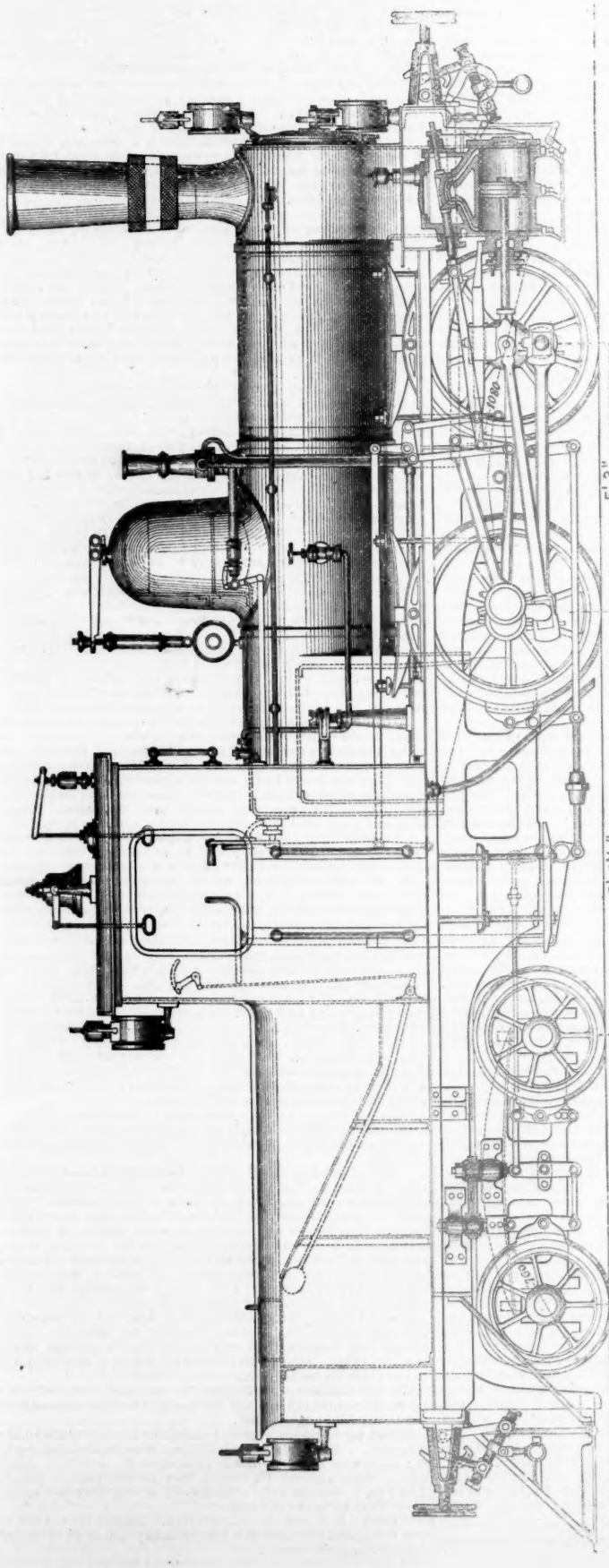
* Signals are sometimes given by blowing horns or whistles on German railroads.

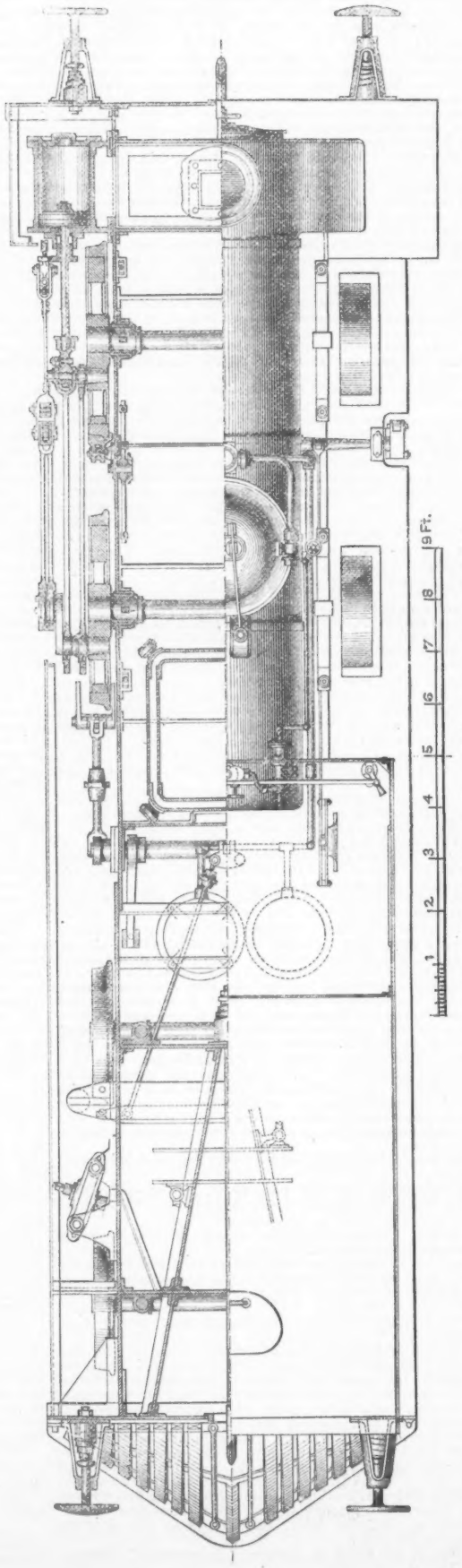


Section Through Cab.



End Elevation of Tank. Cross-Section Through Tank





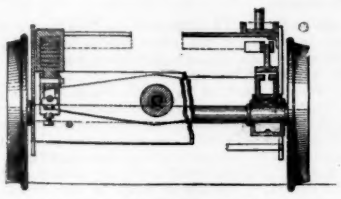
FORNEY LOCOMOTIVE, THYLANDS RAILROAD, DENMARK.

Locomotives for the Thylands Railroad (Danish State Railroads.)

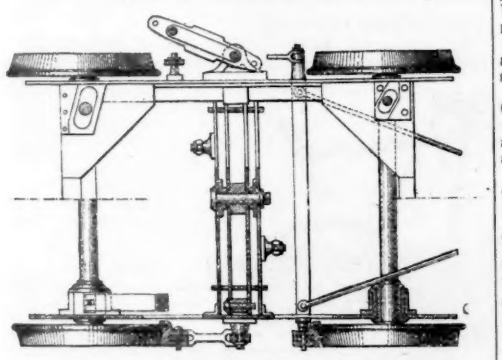
[Contributed by Otto Busse, General Master Mechanic at Aarhuus, to the *Organ* für die Fortschritte des Eisenbahnwesens.]

The Thylands Railroad in Northern Jutland, about 43 miles long, is a light local line. It was required to choose a type of locomotive fitted to work it.

Because of the light rail, weighing 35 lbs. per yard, the maximum weight on a wheel was limited to 6,600 lbs. The maximum speed on the line was fixed at 27 miles per hour,



Cross Section through Truck.



Sectional Plans of Truck.

FORNEY LOCOMOTIVE THYLANDS RAILROAD.

and the locomotive was to carry water for a run of 25 miles, and coal for a run of 87 miles. On account of the numerous and sharp curves the greatest possible flexibility was required in the locomotive.

As on the steepest grades of 66 ft. per mile a total weight of train of 110 tons, exclusive of engine and tender, was considered necessary, two coupled axles were sufficient for adhesion; but in order to give the engine a relatively large boiler and to make it accessible for repairs, I resolved to carry the fuel and water with a part of the weight of the boiler on two running axles.

On many railroads, especially in Sweden, similar requirements have been met by the use of eight-wheeled tank locomotives having a truck in front and two coupled axles behind—the so-called American system—but the engines are much obstructed by the tanks and difficult of access. As this system seemed inadmissible, I attempeed to adapt the Engerth system and also the Behne-Kohl for the purpose; but neither seemed well adapted to small dimensions, and therefore I applied myself to the adaptation of an American design by Forney. Forney's locomotive has an extension of the frame beyond the fire-box carried on a truck, on which the tank rests. In this case if an ordinary truck is used, the driving and coupled wheels get into an entirely wrong position, leading to wear and loss of power. Therefore, I immediately sought for a truck with a lateral motion. But this would result in leaving the engine without other guide on curves than the 5 ft. 3 in. wheel-base of the driving and coupled wheels. It then occurred to me to make the lateral movement dependent upon the angular revolution of the truck, calculating that a rolling motion of the upper part of the engine would be rendered impossible if the truck were so connected with the upper part that no lateral motion of that part could occur without occasioning a change in the angle of the truck. This forcing the truck to turn is effected simply by two rods placed obliquely, with one end fastened to the upper frame and the other to the truck.

The weight is transferred on four supporting bolts on horizontal sockets, and distributed by equalizing springs.

In order that the coupled wheel may not be used in guiding by which it would be worn differently from the driving-wheel, which tends to destroy the coupling-rods, I had the engine run with the tender in front, and had the latter provided with a cow-catcher, which seemed advisable because the road is not fenced and runs through a grazing country.

The engines which have been built have now (December, 1883) run 25,000 and 28,000 miles each, and have answered all expectations. They are especially noticeable for the steadiness of their motion. Their tires wear very evenly without getting sharp, and they have made the above mileage without turning, which, in the small diameter of the wheels (42 in.), and the narrow rail-heads (1¼ in.), must be called a good performance.

Locomotives of this design of greater dimensions can also be used, and since it solves the question of the rolling motion fundamentally, while at the same time any plunging motion is impossible, it seems to me to deserve consideration for service where great tractive power and great speed are required at once, as for passenger trains on mountain railroads. The engine can be made very well with three coupled axles and have a relatively large fire-box, since a part of the weight can be transferred to the truck, and thus fulfill the requisites for the purpose mentioned.

Such an engine would have an advantage over those usual on mountain railroads in its very great stability, and also in this, that the work of repairing and cleaning would not be rendered difficult by the tank portion, which is a disadvantage of engines of the kind named.

Finally, there is the advantage that the adhesion weight is independent of the supply of water and fuel, and there the greatest weight permissible on the rails can be utilized for adhesion.

Action of the New England Railroads as to Automatic Car Couplers.

The delegates appointed by the managers of the New England railroads assembled Dec. 16, at 10 a.m. at the rooms of the New England Railroad Club to consider the matter of taking some action in reference to an automatic freight car coupler and to select, if possible, one of the five recommended by the Massachusetts Railroad Commissioners.

Mr. F. D. ADAMS, president of the New England Railroad Club, under whose auspices the convention was brought about called the meeting to order and announced briefly its object. Mr. Adams then called for a permanent organization, which resulted in the choice of Mr. J. N. Lauder as President (after Mr. Adams had declined to serve); Mr. J. W. Marden as Vice-President, and Mr. J. M. Ford as Secretary.

The PRESIDENT again stated the object of the meeting, and urged the members to a free and open discussion of the subject.

After some discussion a resolution was offered by Mr. Geo. Richards, Boston & Providence Railroad, and adopted:

Resolved, That each delegate shall have one vote and one additional vote for each 1,000 cars or major part thereof, all cars to be counted as one whether of 4 or 8 wheels.

The roads represented (16 in all) and the votes each was entitled to were as follows:

Name of delegate.	Road represented.	No. of votes.
James Denver	New York, New Haven & Hartford	5
D. C. Richardson	Boston & Maine & Eastern	5
Geo. Richards	Boston & Providence	2
J. N. Lauder	Old Colony	4
W. E. Chamberlain	Providence & Worcester	3
S. B. Opdyke	New Haven & Northampton	2
Samuel Barrett	Concord	2
J. M. Foss	Connecticut Valley	4
F. D. Adams	Boston & Albany	8
John Coghlan	Boston, Revere Beach & Lynn	1
James K. Taylor	Boston & Lowell	5
J. G. Brady	Worcester & Nashua	2
Robert Hitchcock	Connecticut River	2
J. W. Marden	Fitchburg	6
J. P. Henney	New York & New England	4
H. H. Marshall	Boston, Barre & Gardner	1
Total (16 roads)		56

The question was discussed by Messrs. J. W. Marden, J. W. Lauder, W. E. Chamberlain, F. D. Adams, Stacy B. Opdyke, Jr., supt. N. H. & N. R. R., Mr. Geo. Richards and Mr. Robert Hitchcock. A motion was then made by Mr. F. D. Adams that the convention proceed to take an informal ballot to indicate the preferences of the delagates for a coupler and that for this purpose each member be entitled simply to his individual vote. The result was as follows, viz.:

In favor of the Ames (hook-link)	8
" " " " United States (link and pin)	3
" " " " Cowell (hook)	2
" " " " Janney (hook)	1
" " " " Hilliard (hook)	0
Total (2 votes not being cast)	14

A discussion then followed in regard to the expense of applying the Ames automatic coupler and the manner in which to apply it to an old car, participated in by Messrs. J. N. Lauder, Robert Hitchcock, F. D. Adams and John Coghlan. Adjourned at 12 m. to meet at 1:30 p. m.

The delegates again assembled at 1:30 p. m., when a long discussion followed on the merits of the Ames and Cowell couplers, participated in by Messrs. Robert Hitchcock, W. E. Chamberlain, F. D. Adams, Leander Garey (by request), J. N. Lauder, Geo. Richards, John Coghlan and J. W. Marden.

The question of the result of the adoption by the several roads of about equal numbers of the five couplers recommended by the Commissioners was also fully considered, and the discussion revealed a general feeling that this course would materially increase the danger to trainmen in coupling cars. The most earnest appeals were made to avoid the danger lying in the recommendation by the commissioners of five different couplers, none of which couple interchangeably or automatically with each other, excepting, perhaps, under favorable circumstances, the United States and the Ames.

In order, therefore, to bring the matter to an issue, it was resolved, on motion of Mr. John Coghlan, that the Convention proceed to take a formal ballot for the coupler to be recommended for adoption.

The ballot resulted as follows:

Number of votes for the Ames	22
" " " Cowell	15
" " " Janney	11
" " " United States	6
" " " Hilliard	0
Total (2 votes not being cast)	54

Mr. W. E. Chamberlain then moves that the United States and Hilliard be stricken from the list, which motion prevailed.

He then moved that the convention proceed to ballot for a choice between the Janney, Cowell and Ames. The motion was carried and the resulting ballot was as follows:

Number of votes for the Ames	22
" " " " Cowell	22
" " " " Janney	11
Total (1 vote not being cast)	55

A second ballot gave the same result.

Mr. Chamberlain then moved to strike out the Janney, and the motion was carried. He then moved to proceed to ballot for a choice between the Ames and Cowell, which motion prevailed, and the result was as follows:

Number of votes for the Ames	22
" " " " Cowell	22
Total (12 votes not being cast)	44

Further discussion was had to endeavor to harmonize on a single coupler, but without result. Nevertheless, there was a general feeling of satisfaction expressed at the result, so it seemed to be generally felt that a great stride has been made toward the desired solution of the coupler question even in coming so near to a definite decision as had now been done in New England. A previous motion made by Mr. Marden to refer the matter to the Executive Committee of the Master Car-Builders' Association was called from the table by Mr. Adams and after discussion resulted in the following resolution:

"*Resolved*, That we, as representatives of the New England railroads, realizing the importance of a single standard automatic freight car coupler, respectfully ask the Executive Committee of the Master Car-Builders' Association to devise some means by which a national convention of representative members from each road in the country, with power to act, be called to consider and decide upon the adoption of some automatic freight car coupler."

The convention then adjourned *sine die*.

The Gardner & Woodbridge Threading Tool.

The accompanying illustration represents a useful little tool lately introduced by the Hartford Tool Co., of Hartford, Conn. It is designed to be attached to a lathe where threads have occasionally to be cut to the correct form. The cutter is supplied carefully milled to the exact shape of the thread required, Sellers, Whitworth or V, and can be sharpened by grinding the top surface, without interfering with the form of the thread cut. The holder is also milled all over to exact shape and case-hardened.

THE GARDNER & WOODBRIDGE THREADING TOOL.

Car Wheels and Axles.

This subject was discussed at the last monthly meeting of the New York Car Builders' Club, held at No. 113 Liberty street on Dec. 18.

The President, Mr. L. Garey, asked whether any of those present advised an increase in the weight of car wheels to meet the increased capacity of cars. Records on some roads showed that 90 per cent. of the wheels removed had cracked plates, showing that this was a weak point.

Mr. M. N. FORNEY remarked that the breakage of wheel centres was unknown in Great Britain, where the railroads furnished exact returns of all failure to the Board of Trade. What is the reason of this great difference?

Mr. W. G. BAKER asked if English railroads exchanged one old wheel for two new ones?

Mr. L. GAREY suggested that car-wheel makers might combine and create a market for the old wheels, so it would be unnecessary to use them in the construction of new ones.

Mr. W. G. BAKER considered 550 lbs. a sufficient weight for a 33 in. wheel for a heavy passenger or freight car, but thought quality more important than weight. Wheels should be bought on a mileage basis, paying say 10 cents per 1000 miles, and returning the old wheels when worn out, to the maker. No maker can afford to guarantee wheels for a fixed number of miles, though an average mileage is possible.

Mr. SNOW thought payment on the average mileage fair to all.

Mr. GAREY suggested that the car-wheel makers should urge this on the railroads.

Mr. W. G. BAKER stated that railroads were not disposed to keep the mileage of wheels.

Mr. GAREY: The mileage is accurately kept on the New York Central*, and there is no difficulty in the passenger service.

Mr. W. G. BAKER: A wheel will wear out quicker in a fast than a slow mileage.

Mr. SNOW suggested a payment by time service.

Mr. GAREY said not only the mileage, but the cost of removing and replacing had to be considered. Could the wheel-makers make a better wheel if they were paid for it?

Mr. J. S. LENTZ asked on what basis of guarantee Mr. Baker would furnish wheels.

Mr. W. G. BAKER: I invariably guarantee wheels as follows: I make a personal inspection of the road, and give a price, say 10 cents per 1,000 miles. If the wheel makes 10,000 miles, and you had paid us $10 for the wheel, we would refund you $9, the old wheel would be ours, and you would pay in reality $1 for the service. If it made 100,000 miles, we would retain the old wheel and the $10, while if it made 200,000 miles you would owe us $10. No wheel-maker could furnish the capital to make the wheels. You pay to-day for the wheel service and not for anything else. You pay, for instance, $5 for a wheel which runs 1,000 miles, and then you resell that wheel for $4. It has cost you $1 for the service. I knew of a case lately where 8,000 550 lbs. wheels were sold for $6.75 each, with a guarantee of 50,000 miles. My price was $12.50. Some makers guarantee enough mileage to get the order.

Mr. SNOW said his company had sold wheels on a mileage basis since 1866. We sell the wheel to the railroad company at a given price. They pay us for it. When the wheel is worn out they credit us with the mileage and charge us the price they originally paid. Wheels come back to me now that are charged to us at $22. This is the only equitable method of selling wheels, but only one railroad that we deal with strictly carries out this plan.

A suburban service with frequent stops is very trying to wheels. The chill becomes disintegrated and destroyed by the frequent application of the brakes, and they will not give as long a mileage there as on continuous through runs. The brakes heat the wheels on the tread, so that they will expand suddenly, and in cold weather contract as suddenly, and the chilled part of the iron becomes separated in the form of a diamond, and after awhile that separation will

* Apparently this applies only to passenger and line service, and not to the whole freight equipment. See Mr. Garey's statement later in the discussion.—*Ed. R. R. Gazette.*

pawl out, and show a bad spot in the wheel. Oftentimes this is done by the application of the brakes just enough to heat the wheel and not destroy it for the time being.

After some further discussion, the following resolution was adopted :

"*Resolved*, That it is the sense of this meeting and the attention of railroad managers is respectfully directed to the same, that wheels purchased for use under passenger train service ought to be bought on a general average mileage basis, and that for all those purchased for freight train service be had upon a general average time service.

Several gentlemen considered that it would be difficult to keep the mileage of wheels in freight service."

Mr. GAREY stated that on the New York Central this was done as regards line service, but not in local service.

Mr. LEIGHTON considered that the value of both chilled and steel tired wheels depended on the mileage, and therefore possibly the latter wheel was really the cheaper. Safety was also important.

Mr. FORNEY : A railroad cannot afford to pay a wheel mileage and have a great many accidents. If at the same time they could get for a higher price a wheel with a greater mileage, it would be very much safer. The question of accidents cannot be ignored. The wheel-maker ought to be charged for every broken wheel.

Mr. CHAMBERLAIN : And make it compulsory for every railroad to adopt the mileage system.

Mr. FORNEY : This is not a question for the railroads entirely, but the question of safety must be considered by them in making their contracts. If you get a steel tired wheel mileage and have an accident for, say, nearly every million miles, it is a point for the railroads to recognize.

Mr. SNOW : We should find out how many breakages and accidents there may be in steel-tired wheels for the number running as compared with cast iron wheels.

Mr. BAKER : A wheel-maker who sells on the mileage basis must get the very best material, because he cannot carry a chill, which is the life of the wheel, without a strong structure to back it up. The only way to demonstrate it is by practical test. In our system of making wheels we have a fixed standard of tensile strength. Our wheels are expensive to make, but are cheap for the railroads. If railroads find that they get a safe wheel, wheel-makers will make wheels upon similar fixed systems.

Safety is the first element. I would not give a guarantee that my wheels would not break, but I would give a guarantee that not more than one wheel in a thousand would break; but it is a question whether railroads would pay for this quality. I use every precaution I can to prevent their breaking.

Mr. FORNEY: Anything is likely to break, but if I was in a position as superintendent of a railroad and had all the responsibilities, and a wheel maker offered to sell me wheels, I should require him to give some sort of a guarantee with reference to breakages. I should fix some penalty for the breakage of wheels. If I was buying, therefore, the first thing for me to do is to protect myself, as far as possible, against the risk of accidents by requiring the wheel-maker to give a guarantee with reference to accidents.

Mr. BAKER: All we propose to do is to cheapen the service of the wheel and improve it; make it cost less money to the railroad company. I would not remain in the business five minutes if I was obliged to guarantee a wheel against breakage or pay the damages resulting from a broken wheel.

The meeting then adjourned.

Hand Cars.

The accompanying illustrations represent improved forms of railroad velocipedes and hand cars recently introduced by the Kalmazoo Railroad Velocipede Co., of Kalmazoo, Mich.

The weight of the velocipede has been reduced from nearly 200 lbs. to 135 lbs. by the substitution of steel and malleable castings for wrought and cast iron respectively. The wheels are wholly made of steel. The tire is hardened, and the spokes are in tension, and therefore cannot be buckled. Steel staples are riveted in countersunk holes in the tire. Bessemer steel spokes, doubled with conical-shaped heads, made cold, pass through the staples, and the heads are hooked in recesses in the hubs. The hub is composed of three pieces ; the tension is produced by screwing the box through the outer spoke receptacle, against the inner spoke eceptacle, thus forcing them apart and drawing the tire toward a common centre, making it true and round. The axle, ⅞-in. diameter, is also of steel. The two driving-wheels are each 20 in. diameter, and are geared 4 to 1, the large gear-wheel being 12 in. diameter, and the pinion 3 in. diameter. The axle revolves in friction roller bearings. The weight of the car and operators is about equally divided between the wheels, so as to give stability in rounding curves. We understand that the machine can be propelled in either direction, and that a speed of from 15 to 18 miles an hour can be obtained on a level track in favorable weather. This claim does not seem exaggerated, as an ordinary bicycle can be propelled along a fairly level highway (where the rolling resistance must be higher than on a metal rail), at a speed of from 10 to 13 miles an hour for a very considerable distance. The gearing gives the railroad velocipede an equivalent diameter of driving-wheel of 80 in. as compared with the 50 in. to 56 in. wheels usual on bicycles, and the increased effective diameter of wheel would seem amply calculated to give the additional speed. The railroad velocipede is of course considerably heavier than a bicycle, but as it is adapted to carry two persons this can hardly be wondered at, and any attending disadvantage is more than outweighed by the fact that railroads are generally laid with far better gradients than even the best roads.

Our other illustration represents a section hand car of the latest and most improved form, manufactured by the same firm. The upright frame or standard supporting the hand-lever fulcrums is made of gas pipe, in order to secure strength with a small weight. The levers and cranks are set at a slight angle to one another, in order to do away with any dead centre, while the connecting or pitman rods are connected to both sides of the spur gearing. The S-formed casting for the brake appears to be a peculiarly neat and simple arrangement. The frame of the car is made of selected white oak, and is strengthened by truss rods. The axles are of steel, 1¼ in. in diameter, with the bearings running in anti-friction metal. The wheels are 24 in. diameter, and it is claimed that a speed of from 18 to 20 miles an hour can be attained. The driving-wheel is geared 3 to 1 by two gear wheels measuring respectively 18 in. and 6 in. diameter. The platform is 6 ft. 2½ in. long, and is calculated to have a capacity for carrying from 8 to 12 men and their tools.

Transportation in Congress.

In the Senate on the 19th:

The Inter-state Commerce bill was taken up, and Mr. George (Miss.) addressed the Senate at considerable length.

In the House on the 19th:

The debate on the Inter-state Commerce bill was continued, occupying the greater part of the day's session.

In the House on the 20th :

Consideration of the Inter-state Commerce bill was resumed and continued until votes on several amendments offered showed no quorum present. Further consideration of the bill was then postponed.

THE SCRAP HEAP.

It Was His Glass Eye.

A conductor on the Boston & Providence road tells the story of a young lady who entered the noon train for Boston the other day. She seated herself opposite a gentleman who, from the first, with one eye at least, seemed to be staring fixedly at her. She became indignant at length, and inquired:

"Why do you look at me so, sir ?"

He said he was not aware of having done so, but she insisted.

"I beg your pardon, madam, but it's this eye, is it not ?" lifting his finger to his left optic.

"Yes, sir, it's that eye."

"Well, madam, that eye won't do you any harm. It's a glass eye, madam, only a glass eye. I hope you'll excuse it. But, upon my soul, I'm not surprised that even a glass eye should feel interested in so pretty a woman." The explanation and compliment combined to put the lady in a good humor.

A Christmas Vacation.

General Manager Finney, of the Wisconsin Central Railway, has issued the following Christmas order: "Christmas will be observed as a general holiday, and employés not imperatively required for service will be relieved from duty on that day. A cordial invitation is extended to all to apply to the superintendent of the division upon which they are employed for free transportation for themselves and actual members of their families. Such passes may be extended from the 23d to the 27th inst. Unmarried employés may ask for passes for a companion. I wish you all a merry Christmas."

Lost His Ticket.

"Now, then, make haste there, will you, and give up your ticket," exclaimed a railway guard to a bandsman in the Volunteers, returning from a review. "Didna I tell ye I've lost it ?" "Nonsense, man; feel in your pockets; you cannot have lost it." "Can I no ?" was the drunken reply; "man, that's nothing; I've lost the big drum."—*Railway Express.*

Railroad Young Men's Christian Association.

The Chicago Association reports for its Forty-seventh street branch in November a total attendance of 2,735 at the rooms. There were five religious meetings, two educational classes, and one entertainment was given. There were 186 visits made to shops, engine-houses, families, etc., and 70 "cottage meetings" were held. There were 42 new members received during the month, and the branch is growing prosperously.

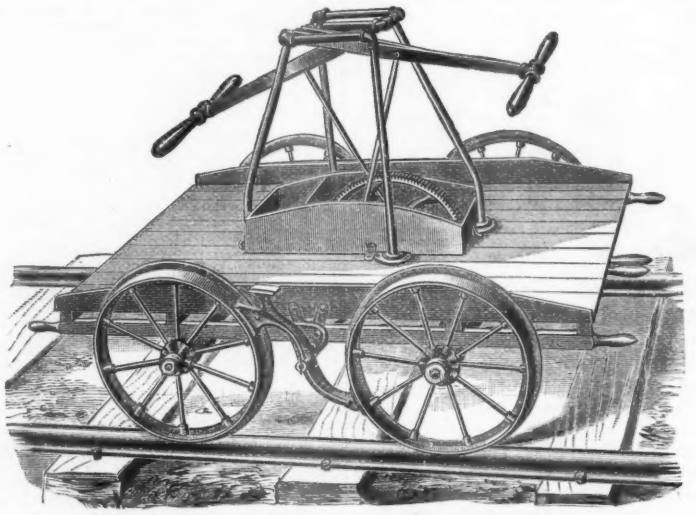
Train Robbers.

In our issue of Dec. 12 appeared an item under this head, which was based upon the press dispatches, and contained several serious errors. A correspondent sends us a corrected statement, which is given below :

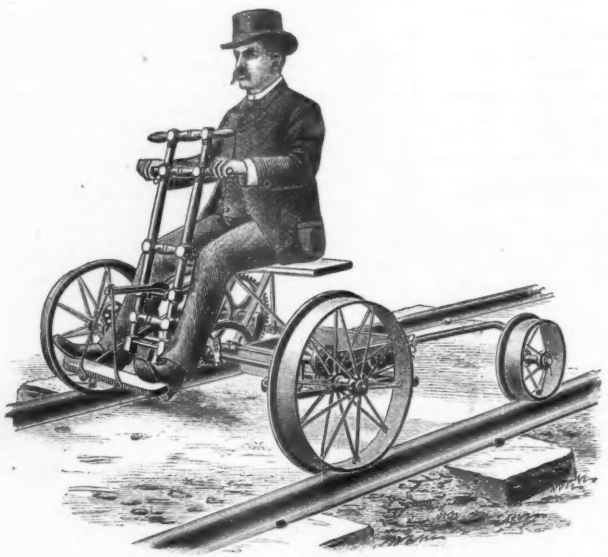
"The passenger train on the *Little Rock, Mississippi River & Texas Railway* was stopped near Little Rock on the night of Dec. 6 by four or five men, who succeeded in carrying off a considerable amount of money and valuables from the passengers, but did not succeed in opening the company's safe or in getting any property from the company whatever. The state offered a reward of $200 for the arrest and conviction of each robber, and the railway company offered a like amount."

Uncle Billy's Railroad.

An Athens, Ga., special to the Atlanta *Constitution* of recent date says: "Uncle Billy Bowers went up to Atlanta last week, and made the final payment on 'Tom Peter,' his little engine that cost $3,000. The road is running for 2¼ miles. Every foot is graded and paid for. He has enough iron to lay another half mile of track. The road has two flat cars, built at Bowersville, and the passenger coach will also be put up there, the trucks being bought in Atlanta. Uncle Billy uses the engine to haul logs to his saw mill and says he is shipping a great deal of lumber and wood over the road that pays enough to keep."



SECTION HAND CAR.



THE KALAMAZOO RAILROAD VELOCIPEDE.

Trainmen Must Not Flirt.

A new order has gone into effect on the Central-Hudson road prohibiting trainmen while on duty from accosting or conversing with any female except in the course of their duty. It is understood that this order has been issued on account of several who have been carrying on extensive flirtations at different points on the line, which in one or two cases have resulted seriously. It must not be supposed that all the trainmen are affected by this. As a rule, they attend strictly to their business and the order is intended for some few who do not.—*Rochester (N. Y.) Democrat and Chronicle.*

Clearly Explained.

The principle of counterbalancing may be stated as follows:

If there be within all parts of a circle described by the centre of gyration of an unbalanced, rotating body, a sufficient amount of matter to resist by reaction the centrifugal tendency of an excessively heavy portion, such heavy portion will strive to recede from the mechanical centre, so long as the impelling force, applied at the mechanical cen

tre, continues and is opposed by inertia; but when the inertia is overcome, the heavy portion will strive to approach the mechanical centre.—*Exchange.*

RAILROAD LAW.

Bridge over Navigable Water.

In the case of Johnson against the Charleston & Savannah Co., the Georgia Supreme Court holds as follows:

1. A stream or water course running into the Savannah River, from 75 to 200 ft. in width and 16 ft. in depth where a bridge was placed across it, and in which the tide rises and falls 2½ ft., and which is open, so as to allow free passage to all water craft running thereon, is a navigable stream, and the public have a right to free navigation thereon. If such a stream be obstructed, such obstruction is a nuisance and may be abated at the instance of any person applying therefor.

2. A person erecting or causing such nuisance is not entitled to notice or demand to abate the same before action brought.

3. A court of equity has the power, under the allegations in the bill and facts shown on the trial, to grant the relief prayed for.

4. Directions given that the decree be modified so as to enjoin the railroad company from placing or putting other obstructions over said stream than as they now exist.

Charter Exemption from Taxation.

In Washington, Dec. 22, the United States Supreme Court rendered a decision in the case of the Memphis & Little Rock Railroad Co., as reorganized, *vs.* the Board of Railroad Commissioners of Arkansas, in error to the Supreme Court of Arkansas. This was a suit brought by the railroad company to enjoin the Board of Railroad Commissioners from appraising, for purposes of taxation, any part of said railroad company's property, on the ground that it was exempted from taxation by a contract with the state, contained in its charter of incorporation. This court holds that the exemption from taxation contained in the incorporating act of 1853 was intended to apply only to the Memphis & Little Rock Railroad Co. as the original corporation organized under it; that it did not pass by the mortgage of its charter and works to the mortgagees or purchasers at the judicial sale; that the franchises contained in the conveyance were limited to those which had been granted, as appropriate to the construction, maintenance and operation of the railroad as a public highway, and the right to profit therefrom; and that the appellant, not having become a corporate body until after the restrictions in the constitution of 1874 took effect, was thereby rendered incapable in law of having or enjoying the privilege of holding its property exempt from taxation. The decree of the Supreme Court of Arkansas is therefore affirmed.

Suing Directors for Mismanagement.

A dispatch from Montgomery, Ala., says: "A very important suit, involving $3,000,000 damages claimed, has just been instituted by the state of Alabama against I. T. Burr, S. A. Carleton and John Demerritt, of Massachusetts; John C. Stanton, of New York, and D. N. Stanton, of New Jersey, directors of the Alabama & Chattanooga Railroad, a road which was built from Chattanooga through Alabama in 1870 by state aid, and in 1873 went into bankruptcy. The case will be tried in the United States Supreme Court, it having been decided that it has original jurisdiction. The state is suing for damages alleged to have been sustained by the mismanagement of the directors. Georgia will bring a similar suit."

ANNUAL REPORTS.

Boston & Maine.

This company owns a line from Boston to Portland, Me., 115.50 miles, with four short branches, 11 miles in all, making 126.50 miles owned. It leases the Newburyport road 26.98 miles; the Danvers road, 9.26 miles; the Lowell & Andover, 8.50 miles; the West Amesbury Branch, 4.50 miles; the Kennebunkport road, 4.50 miles, and the Dover & Winnipiseogee, 29 miles, making 82.74 miles leased, and 209.24 miles owned and leased. The Methuen Branch (owned), 3.75 miles, is leased to the Manchester & Lawrence Company, leaving 205.49 miles worked. Most of the leased lines are practically owned by the company. The 51st annual report is for the year ending Sept. 30 last.

The equipment consists of 92 locomotives; 205 passenger train cars; 2,267 freight cars, and 13 snow-plows.

The balance sheet, condensed, is as follows:

Stock (received from sale of 70,000 shares)		$6,921,275
Bonds		3,500,000
Notes payable		789,700
Accounts and balances		215,885
Profit and loss		1,612,917
Total		$13,039,777
Road and equipment	$10,820,960	
Leased lines, stocks, bonds, etc	1,041,797	
Second track, new bridges, etc	358,173	
Materials	308,835	
Bills and accounts receivable	229,751	
Cash	230,261	
		13,039,777

The bonds all bear 7 per cent. interest, and are plain bonds, $1,500,000 due in 1893 and $2,000,000 in 1894. An issue of $1,000,000 improvement bonds has been authorized.

The traffic for the year was as follows:

	1883-84.	1882-83.	Inc. or Dec.	P. c.
Train miles	2,178,181	2,028,735	I. 149,446	7.4
Passengers carried	7,054,309	6,488,756	I. 565,553	8.7
Passenger miles	89,587,566	85,216,481	I. 4,371,085	5.1
Tons freight carried	958,332	946,906	I. 11,426	1.2
Ton-miles	44,937,544	48,736,777	D. 3,799,233	7.7

There was an increase in local passenger traffic, but a decrease in local freights. In through business there was but little change. The average passenger journey last year was 12.7 miles; the average freight haul was 46.9 miles.

The earnings for the year were as follows:

	1883-84.	1882-83.	Inc or Dec.	P.c.
Passengers	$1,704,228	$1,679,603	I. $24,625	1.5
Freight	1,095,664	1,134,872	D. 39,208	3.5
Mail and express	104,478	101,469	I. 3,009	2.9
Rents, etc	97,433	75,486	I. 21,947	29.1
Total	$3,001,803	$2,991,430	I. $10,373	0.3
Expenses	2,016,348	1,964,384	I. 51,954	2.6
Net earnings	$985,455	$1,027,046	D. $41,571	4.0
Gross earn. per mile	14,608	14,787	D. 179	1.2
Net earn. per mile	4,796	5,077	D. 281	5.5
Per cent. of expenses	67.17	65.67	I. 1.50	....

Expenses include taxes, which were $126,757 last year. The increase in the expenses was mainly in the items of personal injuries, damages, new machinery and taxes.

The income account is as follows:

Net earnings as above		$985,455
Rent of leased lines	$90,125	
Interest on bonds	245,000	
Improvement account	86,242	
Dividends, 8 per cent	560,000	
		981,367
Balance, surplus		$4,088

The total amount expended for improvements of road and additions to equipment was $113,615, of which the sum of $86,242 was charged to income, the balance of $27,373 being the surplus from the previous year.

During the year 2,538 tons of steel rails and 95,214 new ties were used, 716 tons in extension of second track and the rest in renewals. The second track from Portland east was extended 8 miles, making in all 92 miles now in use, and leaving 43 miles of single track on the main line. Improvements include 2.33 miles of new sidings, a new bridge over the Cocheco at Dover, the rebuilding of several smaller bridges, improvements of station buildings, etc. Seven locomotives, 2 parlor, 9 passenger, 2 combination and 150 freight cars were bought or built. Of these 4 locomotives, 4 passenger and 42 freight cars take the place of old ones broken up.

The report refers at length to the lease of the Eastern Railroad, now completed and in effect.

Providence & Worcester.

This company owns a line from Providence, R. I., to Worcester, Mass., 43.41 miles, with a branch to East Providence, 7 miles, making 50.41 miles in all. The report is for the year ending Sept. 30.

Up to Sept. 30, 1883, the company operated the Milford & Woonsocket and the Hopkinton roads, 15.43 miles, but the leases of those roads then expired and were not renewed. On the line owned there are 42.38 miles of second track and 35.68 miles of siding; an increase during the year of 1.35 miles of siding.

The equipment consists of 37 locomotives; 40 passenger and 13 baggage and mail cars; 1,850 freight cars. This shows an increase of 3 locomotives.

The general balance sheet, condensed, is as follows:

Stock		$2,500,000
Bonds		1,242,000
Notes payable		512,30
Accounts and balances		85,489
Profit and loss, surplus		437,995
Total		$4,777,784
Road and equipment	$4,450,264	
Materials	118,662	
Accounts and balances	7,105	
Cash	201,753	
		4,777,784

Stock and bonds remain unchanged; notes payable were increased $56,000 during the year. Cost of road and equipment was increased $85,395.

The traffic for the year was as follows:

	1882-84.	1882-83.	Inc. or Dec.	P.c.
Train miles:				
Passenger	290,109	299,050	D. 8,941	3.0
Freight	252,995	272,544	D. 19,549	7.1
Switching and service	221,123	202,862	I. 18,261	9.0
Total	764,227	774,456	D. 10,229	1.3
Pass. car miles	1,125,592	1,094,721	I. 30,871	2.9
Freight car miles	4,169,361	4,544,929	D. 375,568	8.1
Passengers carried	2,587,798	2,502,739	I. 85,057	3 4
Passenger-miles	20,757,058	20,585,077	I. 171,981	0.8
Tons freight carried	762,243	804,021	D. 41,778	5.2
Ton-miles	21,596,979	23,174,410	D. 1,577,431	6.8
Av. train load:				
Passengers, No.	72	69	3	4.3
Freight, tons	85	85	....	....
Av. rate:				
Per pass.-mile	2.12 cts.	2.14 cts.	D. 0.02 cts.	0.9
Per ton-mile	3.09 "	2.96 "	I. 0.13 "	6.6

The average rate for through passengers was 2.41; local, 2.22; season-ticket, 0.69 cent per mile. The average rate on through freight was 2.12 cents per ton-mile.

The earnings for the year were as follows:

	1883-84.	1882-83.	Inc. or Dec.	P.c.
Freight	$667,607	$686,090	D. $18,483	2.7
Passengers	441,678	443,016	D. 1,338	0.3
Mails, etc	27,348	29,289	D. 1,941	6.7
Total	$1,136,633	$1,158,395	D. 21,762	1.9
Expenses	869,901	855,144	I. 14,757	1.7
Net earnings	$266,732	$303 251	D. $36,519	12.1
Gross earn. per mile	22,548	17,594	I. 4,954	22.8
Net earn. per mile	5,291	4,666	I. 685	14.9
Per cent. of expenses	76.53	73.82	I. 2.71	....

Expenses include $42,771 for taxes and $9,100 rent of Union station at Worcester. They also include improvements of road and equipment.

The income account is as follows:

Net earnings, as above		$266,732
Decrease in property on hand		10,354
Bills payable, increase		56,000
Total		$333,086
Interest account, balance	$96,368	
Back dividends paid off	1,323	
Dividends, 6 per cent	150,000	
Construction, second track, land, etc	85,395	
		333,086

The expenses include about $175,000 improvements, including new side tracks, iron bridges, new station and yard at Valley Falls, electric signals and two new locomotives.

Extension of the second track has been delayed by the necessity of condemning lands by legal process. The shops at Valley Falls are completed, and all the work was transferred to them Jan. 1, 1884.

Business suffered from the general depression, but there was a considerable increase in local passenger traffic.

The matter of terminal facilities in Providence still remains unsettled, but a final agreement is expected soon.

Wilmington & Weldon.

This company owns a line from Weldon, N. C., to Wilmington, 161¼ miles, with branches from Rocky Mount to Tarboro, 17¾ miles, and from Halifax to Scotland Neck, 19 miles, making 198 miles in all. The 49th annual report is for the year ending Sept. 30 last.

The equipment consists of 30 locomotives; 14 passenger, 6 combination, 3 postal and 4 baggage and express cars; 271 box, 10 stock, 135 flat and 11 caboose cars; 1 pay car, 1 officers' car, 1 wrecking and 2 bridge cars.

The general account, condensed, is as follows:

Stock		$2,082,400
Funded debt		1,157,400
Current accounts and balances		48,061
Steel rail account		47,135
Profit and loss		609 697
Total		$3,944,693
Road and equipment	$3,430,595	
Stocks owned	54,054	
Trustees of sinking fund	138,000	
Accounts and balances receivable	210,834	
Cash	111,210	
		$3,944,693

The funded debt consists of $221,400 sterling 7 per cent. bonds, due 1886, and $936,000 gold 7 per cent. bonds, due 1896. In addition to these the company holds $462,000 bonds of 1896, unissued.

President Bridgers recommends the replacing of the remaining iron with steel while it is cheap, the replacing of the five largest wooden bridges on the road with iron and the addition of two locomotives and two passenger cars to the equipment. Business for the current year will not be very good, owing to the light demand for forest products.

The traffic reported is as follows:

	1883-84.	1882-83.	Inc. or Dec.	P.c.
Train miles:				
Passenger	314,959	318 248	D. 3,289	1.1
Freight	241.064	248,063	D. 6.999	2 8
Service and Switching	86.308	68,010	I. 18.298	26.9
Total	642,331	634,321	I. 8,010	1.3
Passengers, through	38,136	34.797	I. 3,339	9.5
" local	136,601	138,327	D. 1,726	1.3
Total	174,737	173,124	I. 1,613	0.9

Locomotive service cost 18.20 cents per mile, as against 12.04 cents the preceding year. Locomotives ran an average of 21,411 miles each last year.

The earnings for the year were as follows:

	1883-84.	1882-83.	Inc. or Dec.	P. c
Freight	$412,993	$426,133	D. $13,140	3.1
Passage	271,461	263,241	I. 8,220	3.1
Mail, etc	103,500	108,055	D. 4,495	4.2
Total	$788,014	$797,429	D. $9.415	1.2
Expenses	493,383	601,549	D. 108,166	18.0
Net earnings	$294,631	$195,880	I. $98,751	50.4
Gross. earn. per mile	3,980	4,027	D. 47	1.2
Net earn. per mile	1,488	989	I. 499	50.4
Per cent. of exps	62.61	75.44	D. 12.83	....

Expenses include all renewals and improvements of road. The large reduction last year was in part due to the improvements in permanent way made in preceding years.

The income account was as follows:

Net earnings, as above		$294.631
Interest received, etc		23,942
Increase in steel rail account		5,496
Total		$324,069
Interest paid	$80,698	
Sundry accounts	10,265	
Dividends, 8 per cent	166,592	
		257,555
Surplus for the year		$66,514
Assets, Oct. 1, 1883	$393,529	
Less paid to trustees of sinking fund	138,000	
		255,529
Assets, Sept. 30, 1884		$322,043

During the year 2,000 tons of steel rails and 72,969 new ties were laid; 2.08 miles new sidings were built, 271 ft. of trestle filled in and 30.09 miles of new road were ballasted. Improvements were made in several bridges and a brick station built at Tarboro. Two new passenger cars were built. The Scotland Neck Branch has been brought up to good condition. There are now only 35 miles of iron left in the main line.

Wilmington, Columbia & Augusta.

This company owns a line from Wilmington, N. C., to Columbia, S. C., 189 miles. The report is for the year ending Sept. 30.

The equipment consists of 27 locomotives; 16 passenger, 6 postal and 4 baggage and express cars; 389 box and 182 platform cars.

The general balance sheet, condensed, is as follows:

Stock		$969,600
Bonds		1,600,000
Current accounts and balances		76,616
Steel rail account		46,690
Profit and loss		154,744
Total		$2,838,050
Road and equipment	$2,569,260	
Stocks and bonds owned	80,195	
Accounts and balances receivable	79,381	
Cash	109,214	
		$2,838,050

The bonds are all of one issue, first-mortgage bonds bearing 6 per cent. interest and due in 1910.

The traffic report is as follows:

	1883-84.	1882-83.	Inc. or Dec.	P.c.
Train miles:				
Passenger	320.633	294,376	I. 26,257	8.9
Freight	228,562	240,902	D. 12,340	5.1
Service and switching	93,860	94,010	D. 150	0.2
Total	643,055	629,288	I. 13,767	2.2
Passengers, through	35,800	31,471	I. 4,329	13.3
" local	89,851	91,380	D. 1,529	1.7
Total	125,651	122,851	I. 2,800	2.3

Locomotive service cost 13.04 cents per mile run, as compared with 13.06 cents for the preceding year. The average mileage per locomotive last year was 23,817 miles.

The earnings for the year were as follows:

	1883-84.	1882-83.	Inc. or Dec.	P.c.
Freight	$370,236	$403,415	D. $33,179	8.2
Passage	195,945	195,701	I. 244	0.1
Mail, etc	86,689	119,483	D. 32,794	27.3
Total	$652.870	$718,599	D. $65,729	9.1
Expenses	455,384	513,307	D. 57,923	11.3
Net earnings	$197,486	$205,292	D. $7,806	3.8
Gross earn. per mile	3,454	3,802	D. 348	9.1
Net earn. per mile	1,045	1,086	D. 41	3.8
Per cent. of expenses	07.75	71.43	D. 1.68	....

The loss was in freight and miscellaneous receipts. Expenses include renewals and improvements of road noted below. Receipts on local business were diminished by lower rates.

The income account was as follows:

Net earnings, as above		$197,486
Dividends and interest received		14,854
Increase in steel rail account		10,544
" " floating debt		21,078
Total		$243,942
Interest paid	$96,000	
Central R. R. of S. C., share of deficit	1,711	
Atlantic Coast Line Sleeping Car Ass'n	6,000	
Land purchased	2,702	
Dividends paid, 6 per cent	57,600	
		$164,013
Surplus for the year		$79,929
Surplus, Oct. 1, 1883		108,667
Surplus, Sept. 30, 1884		$188,596

During the year 2,000 tons of 56-lbs. steel rails and 82,140 new ties were laid; there were 31.46 miles of road ballasted and 0.59 miles of new sidings laid. The change of road at Columbia required the building of 1.61 miles new track. Two new passenger cars were built. There were 1,254 ft. of trestle filled in.

The report says that a change from 5 ft. to 4 ft. 8½ in. gauge cannot long be postponed, and the company is now accumulating a cash fund for that purpose.

The Central Railroad of South Carolina, which this company leases jointly with the Northeastern Co., earned $84,556. The working expenses were $56,978 and the net earnings $27,578. The rental being $31,000, there was a deficit of $3,422. The condition of the road was much improved.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE YEAR.

The depressed condition of industry seems first to have been fully and generally realized little more than a year ago, though the downward course began with the last half of 1881. During the past year the signs of bad times have increased and become plainer, in a further general fall of prices of commodities, the reduction of production of manufactories, the closing of many works, reduced wages, numerous strikes of workmen, a falling-off in railroad earnings, a great decrease in railroad construction, and probably a considerable reduction in the construction of buildings (which in prosperous times employs great armies of men and gives activity to many important industries which provide materials), many bankruptcies, a great decrease in the profits of nearly all kinds of business, and a very large fall in the prices of most railroad stocks and many railroad bonds. There has been something like a panic at a time when money was abundant and the rates of interest were exceptionally low. New enterprises are scarcely heard of. Factories and railroads are generally so unprofitable that only in very exceptional circumstances are capitalists willing to add to their number.

These are signs that we are suffering the consequences of a great industrial debauch, which began in 1879 and culminated in 1881 and 1882. The effects of it were visible when looked for in the last half of 1881, but at that time the popular remedy was a little more of the stimulant; and the unnatural and misdirected energy that had been developed by that time was manifested at its height, in one direction at least, in 1882, in the construction of 11,600 miles of new railroad—an addition of 11 per cent. in a single year to the already great railroad system of the country. A great many manufacturing industries were developed at something like the same rate, and the development continued for some time after the immediate prospects of those industries had become unfavorable, because it frequently requires two or three years to establish such enterprises. Thus even last year a large number of new factories were opened, though very few were begun then.

The figures which we give in another article, the "Course and Condition of the Sources of Traffic," illustrate to some extent the one-sided way which the growth of the country has taken. It illustrates it but imperfectly, because we have few statistics of manufacturing industries, which have grown with great rapidity. But if we had a census of the *capacity* of our various industrial establishments, we should certainly find that many manufactures have increased enormously since 1878, and most of all those engaged in producing materials for construction—lumber and timber, iron and other metals, brick, etc., these being largely used for the purpose of increasing the production of other commodities. The one prominent and unmistakable sign of this is the enormous railroad construction. A railroad has economic value to the country only to increase or cheapen the production of other commodities. Now from the beginning of 1879 to the end of 1882 the increase in the miles of railroad in the country was no less than 43½ per cent., while the increase of population was less than 15 per cent. and the increase in area of cultivated land was about 10 per cent. Probably there were few industries, except some manufacturing construction materials, whose growth was so enormously out of proportion to that of population and agriculture, and perhaps none which, like the railroads, depend for their support on the total population and production of the country, has made such rapid progress.

We do not mean to say that all industries should advance alike and in proportion to the growth of population. The increase of wealth and the average comfort depends on our making production grow faster than population, so that there may be more for each individual; and when wealth increases the individual consumption of some things may increase but little, or not at all, so that the demand for some other things may increase much faster. The laborer who has had his fill of bread, and has eaten little else, when he has a large income may buy butter, cheese and meat, and so enormously increase the demand for and actual need of these; and so of other commodities. But there is scarcely any industry of importance which can be expanded at the rate of 10, 15 or 20 per cent. a year for a few years, without being overdone. While there are consumers for all the community can produce, working at the highest pressure, there is not a demand for anything that can be produced in any quantity, as we should soon find if we should all go to farming. The proper distribution of productive forces, so as to produce only what the community wants, is as important as to keep the productive forces always employed, and an extremely difficult problem. It was manifest, however, when we built 11,600 miles of new railroad in one year, having built less than 3,000 miles four years before, that we could not continue to produce railroads at this rate, and that when the industries engaged in supplying materials for them had been expanded enough to supply enough for such a mileage, they had grown too fast. The difference between that construction and the construction of this year is more than 7,000 miles, and such a decrease of itself must have been severely felt by many industries, and we all know that it has been severely felt.

We do not know how better to indicate the extent to which the changes of the past few years have affected the railroads than to give the following figures from the close of our article on the source of traffic. These give the number of inhabitants in the United States, the acres of grain and cotton, and the number of bushels of corn and bales of cotton produced, *per mile of railroad*, for the last six years:

Year.	Population.	Acres.	Bu. grain.	Bales cotton.
1879	581	1,565	31,600	67.73
1880	545	1,466	28,932	70.53
1881	509	1,359	19,804	52.65
1882	473	1,236	23,405	50.18
1883	462	1,204	21,563	47.00
1884	458	1,202	23,590	43.04

We see here how much less there is now of all these things to support a mile of railroad than there was in 1879 and 1880, when the railroads were most prosperous. These things, of course, are not the sole support of the railroads. Agricultural products form but a small proportion of the traffic of many railroads, and a very large one of but few. But population and area cultivated are certainly the chief elements in our national wealth; for the production of the non-agricultural industries is to a large extent dependent on agriculture, and is very closely limited by the population. Even with the reduced railroad construction of this year, there has been a slight further reduction in the population per mile of railroad. It is encouraging, however, to see that it has been but slight, and that the acreage cultivated per mile has been substantially maintained.

In the downward course we have taken since 1880 bad crops have counted for something, and we have not that to complain of this year.

At this time, probably, people do not need to be convinced that things went wrong after 1880, and many will not interest themselves in the causes. What they want to know is how long the bad times will last and whether they will get any worse. The fear that they may get worse doubtless has a very great effect now, though perhaps more on prices than production. People are afraid to buy, lest what they buy may go down on their hands, and the effect of this on the prices of railroad securities, especially, is immense.

We shall not venture to prophesy, but may point out some of the facts of the situation, as we have a great many in the other article.

In the first place, however far wrong we may have gone in unduly expanding many industries, we have stopped that altogether now. The work of adjusting the productive forces so as to make more of what is wanted and less of what is not wanted is in progress—and a very painful process it is while it lasts, necessitating a change of occupation or the idleness of some and the practical abandonment of some great investments of capital. The large grain crops of the year are going to increase our wealth, in spite of the low prices, and of the greatest of these crops, corn, we have hardly begun to feel the effect yet. We see no reason to believe that the extremely low price of wheat is likely to be permanent, or that the competition with this country in supplying the European demand for breadstuffs is likely to be appreciably greater hereafter than it has been heretofore.

Again, the depression has now lasted a considerable time. There has been an almost universal shrinkage of prices. Producers have had time to adjust their business to the changed condition of things, and some have already succeeded. Many of the painful steps which have to be taken before bad times turn to good ones have already been taken. Whether it will not be necessary to take still more remains to be seen. The effects of the changes already made we have not had time to feel yet. In such times sometimes more than one trial has to be made before we learn what we can safely do.

There is nothing like the financial distress now that there often has been in bad times. Among railroads the contrast with the period after 1873 is marked. The proportion of bonds on which interest is not paid is comparatively very small, and the prices on the exchanges show that there is little apprehension of any great addition to the number.

Nor, in spite of a good deal of uncertainty as to the future, is there any thing like the distrust that has prevailed sometimes. Money was scarcely ever more abundant, and capital can be had for enterprises which give good promise of success, though they are sharply scrutinized because of recent painful experience. The cessation of railroad construction on a large scale is especially advantageous to the existing railroads, which will get whatever growth of traffic there may be.

In the railroad history of the year perhaps the chief fact is the effect, then first distinctly felt, of the multiplication of trunk lines between the West and the Atlantic seaboard. These lines compete with the railroads with heaviest earnings, whose number had not, especially east of Ohio, been increased for a long time. They began to carry at a time when the total traffic had grown smaller instead of larger, and although some of them have not yet so large a share of the traffic as they are likely to obtain eventually, they have made themselves felt severely, reducing materially the earnings of two of the Eastern trunk lines and of several of their Western connections. West of the Missouri River also the completion of new lines across the continent and in the interior has had an important effect on the earnings of some of the older roads. Connected with the increase in competition we may class the railroad wars, which have been quite numerous, but not so long lived, and in the East not so desperate, as in some other years. The Eastern trunk-lines have had no open contest except over the passenger business, but they worked for months with a regular east-bound rate which was nearly as low as any ever made in an open war, and they have several times returned to it irregularly for a week or two at a time. At present they seem to be maintaining rates fully as well as usual except on passengers, and the contest over that business seems almost wholly due to the competition of two of them for local business.

West of Chicago there was trouble over the trans-Missouri business most of the year and passenger rates between Chicago and Missouri River points went down to a dollar, against a regular rate of nearly $15. The troubles of the Chicago roads have been settled; those of the lines west of the Missouri are now under negotiation. There have been many more contests in different parts of the country, and altogether there were more difficulties than usual. The entrance of new lines into the field has made it difficult to settle them, as it was difficult to decide how much traffic these lines could command.

With reduced traffic and low rates, a reduction of earnings has been unavoidable. For the first ten months of the year the average decrease in earnings per mile of such of the railroads as report was about 8

per cent. For the first five months of the year it was about 4½ per cent. It has been more than 10 per cent. in every month since July. Of late months there has been also a large decrease in expenses on many roads, and in many cases, doubtless, a large part of the decrease has been due to a postponement of expenditures for maintenance, all of which will have to be made good eventually. But the lower prices of materials and, in many cases recently, reductions of wages, have also contributed largely to the decrease in expenses.

On the technical side the year has not much to show in the way of accomplished facts. The reduction in traffic on most roads has made one of the tasks of the managers easier—giving them more facilities than were actually required for the work to be done. But there has come instead the difficulty of doing work with very little money, and all over the country railroad officers are trying to find where they can cut down expenses. The introduction of more effective motive power, larger cars, and heavier trains does not make much headway when a railroad has more rolling stock than it can keep employed.

But if not much has been accomplished, a beginning has been made in some reforms of importance, though they aim at safety rather than economy. The question of some substitute for the present most dangerous coupling apparatus has finally got the attention of the railroad managers and to a certain extent of the public, and seems likely to keep it until a change is effected, though not much progress in that direction has been made yet, except in securing attention to it. There is, too, more interest than heretofore in block signaling and interlocking apparatus. These with continuous freight train brakes and a great reduction of the grade crossings of highways and railroads are the improvements which are likely to engage the attention of the managers of our railroads most seriously until they are generally accomplished. The reduced profits of the railroads will make them less willing to spend money for these or any other improvements, unless they result in an immediate economy, but for many railroads they cannot long be delayed.

The immediate prospect for the new year is that there will be a large traffic in most farm products except cotton, but at moderate rates; that the shipments of many manufactures and merchandise will be smaller than for some years previous, and that travel, owing to reduced incomes, will be light, except where stimulated by great reductions in rates. There is not now nearly so much disturbance from railroad wars as there was during the fall months, and there is no apparent reason why the winter traffic should not be generally profitable, though it cannot well be, taking it altogether, very large. The contest between the West Shore and the New York Central will unfavorably affect the trunk lines as long as it lasts; but it affects themselves chiefly, and the others not nearly so much as if the through freight traffic was the business disputed for.

While there are reasons why things should get no worse, it is difficult to see how there can very soon be a very great improvement—that is a sufficient demand to keep manufactories busy up to their present capacity and largely to increase railroad earnings. The figures we have published indicate that for anything of this kind we shall have to wait. For many, however, it will be a great improvement to find business taking a positive turn, however slight, in the right direction, and it is entirely possible that we may see such a turn within the coming year.

COURSE AND CONDITION OF THE SOURCES OF TRAFFIC.

In order to make any rational estimate of the causes of the present condition of industry and traffic and of their probable course in the future, we need to know what has been the growth at different times and what is the present development of the industries which lie at the foundation of traffic—how much traffic there is, at what rate it has grown, what is its course now, and what the means are for carrying it. These facts can be ascertained only very imperfectly, but some of those which have a great influence and nearly all the others are known approximately, and below we give such of these as are ascertainable. In considering them we should bear in mind that the development of the country since 1879 has been chiefly in the non-agricultural industries, but definite information as to the extent to which these industries have grown is very meagre, and their rate of healthful growth in this country is limited by the growth of population and agriculture.

The population of the United States July 1, in each of the last six years, reckoning on the basis of a natural increase of 2 per cent. a year plus the emigration, which almost exactly accounts for the increase from 1870 to 1880, has been:

Year.	Population.	Year.	Population.
1879	48,679,000	1882	53,582,000
1880	50,155,000	1883	55,324,000
1881	51,827,000	1884	56,940,000

The decrease in immigration has made the rate of growth a little less this year than in some previous years. The immigration for the years ending June 30 has been:

1879.	1880.	1881.	1882.	1883.	1884.
177,826	457,257	669,431	788,992	593,114	509,834

The number of arrivals has decreased still further since June, indicating that the country is not offering such attractions to laboring men, who form the bulk of the immigrants, as for some years previous.

Agriculture lies at the basis of our national prosperity. As we export very little except the products of this industry, petroleum and the precious metals, the growth of manufactures is limited finally by the growth of agriculture. This is measured by the area under cultivation, not by the quantity of products, as the latter vary with the seasons. The chief crops are grain, cotton and *grass*. Of the latter, which is, perhaps, the most important, the information is meagre, but the reported increase in acreage of hay land has not been great for some years. The statistics of live stock indicate an increase from 1883 to 1884 not greater than the rate of increase in population, and since 1880 a considerable decrease in the number of hogs. Statistics for the earlier years are very imperfect.

The acres of cereals and cotton harvested in each of the following years have been:

	Grain.	Cotton.	Total.
1873	77,820,000	10,806,000	88,636,000
1876	103,312,000	11,641,000	114,953,000
1879	118,665,000	14,388,000	133,053,000
1880	120,926,000	16,120,000	137,046,000
1881	123,388,000	16,851,000	140,239,000
1882	125,721,000	16,276,000	141,997,000
1883	129,676,000	16,778,000	146,454,000
1884	134,940,000	17,449,000	151,389,000

In different periods the percentage of increase has been:

	Grain.	Cotton.	Total.
1873 to 1876	32.6	7.6	29.7
1876 to 1879	14.9	23.7	15.8
1879 to 1882	6.0	13.1	6.7
1882 to 1884	6.5	7.2	6.6

It is a striking fact that while from 1877 to 1879 the area in grain increased probably 18,500,000 acres (more than 19 per cent.), from 1879 to 1881, the years of greatest prosperity, the increase was 4,800,000 acres (4 per cent.). And now, after an immense increase in railroad mileage, which has been largely in new country where grain-growing is the chief industry, the increase in acreage in the three years since 1881 has been but 11,380,000 acres, or 9½ per cent., not two-thirds as much in amount as the increase in the two years from 1877 to 1879. It is noticeable, however, that the increase, which had been only about 2 per cent. yearly from 1879 to 1881, rose to 3.18 per cent. in 1883, and 3.37 per cent. in 1884. From 1879 to 1884, however, the increase in the grain acreage has been but 13¾ per cent., while the increase in population has been nearly 15 per cent.

The average number of acres of grain and cotton per 1,000 inhabitants has been:

1879.	1880.	1881.	1882.	1883.	1884.
2,730	2,733	2,706	2,643	2,647	2,659

Thus, the acreage per inhabitant, which decreased 3.3 per cent. from 1880 to 1882, increased ½ per cent. last year, when, however, it was 2¾ per cent. less than in 1880.

The cotton acreage is marked by a somewhat similar fluctuation in the rate of growth. Its rapid growth began much later, being slow from 1873 to 1876, more than 6 per cent. yearly from 1876 to 1879, 12 per cent. from 1879 to 1880, and then becoming about stationary, increasing but 4 per cent. in four years. The estimate of 4 per cent. increase last year is a preliminary one, made by the Department of Agriculture just after planting, and subject to revision. It is more likely to be too large than too small.

The production of grain of all kinds for six successive years, has been, in *millions* of bushels:

1879.	1880.	1881.	1882.	1883.	1884.
2,686	2,704	2,034	2,688	2,622	2,970

It will be noticed that though the acreage increased steadily from 1879 to 1883, the production did not increase, and in 1883, with 10 per cent. more acres than in 1879, there was 2¾ per cent. less grain. This year, with 13¾ per cent. more acres than in 1879, there is 10½ per cent. more grain. This is the first year since 1880 that grain crops have been generally good, but there were excellent crops of all grains but corn in 1882, and of spring wheat and oats last year.

The production of grain per inhabitant has been in bushels:

1879.	1880.	1881.	1882.	1883.	1884.
55.1	53.9	39.2	50.1	47.4	52.2

The crops per inhabitant this year is thus 10 per cent. more than last year, 4 per cent. more than in 1882 and 33½ per cent. more than in 1881, but it is 3 per cent. *less* than in 1880 and 5 per cent. less than in 1879—which was the year of largest production for a long time.

The production of cotton for six successive years, accepting *Bradstreet's* estimate for this year, has been, in bales:

1879.	1880.	1881.	1882.	1883.	1884.
5,757,397	6,589,329	5,435,845	6,992,234	5,713,000	5,418,000

The crop was poor this year, and not good last year. The estimate by *Bradstreet's* for this year is below that of the Department of Agriculture, and may be too small.

The number of bales of cotton produced per 1,000 inhabitants has been:

1879.	1880.	1881.	1882.	1883.	1884.
11.8	13.1	10.5	13.1	10.3	9.5

These being the crops, we shall trace the *direct* effect of them on traffic by following the movement of them.

The receipts of grain of all kinds, including flour, at the eight leading Northwestern markets since July, and the receipts of the seven Atlantic ports since August, for the last six years, down to the middle of December, have been, in bushels:

	Receipts.			Receipts.	
Year.	Northwest.	Atlantic.	Year.	Northwest.	Atlantic.
1879	133,996,327	122,364,163	1882	128,111,627	90,845,093
1880	157,674,356	120,898,408	1883	159,964,816	90,867,820
1881	121,701,507	82,468,540	1884	162,047,168	90,611,389

The fall movement, to the Northwestern markets, we see, was larger this year than ever before (though but 1½ per cent. more than last year); but the receipts at the Atlantic ports were a third less than in 1879 and 1880, and have scarcely varied at all for the last three years, in spite of great fluctuations in the crops.

The *exports* of flour and grain have varied very closely with the prosperity of the country, growing very rapidly after 1877 and falling off greatly after 1881.

Since 1872 they have been, in bushels (estimating December of this year):

Year.	Bushels.	Year.	Bushels.
1873	107,149,034	1879	270,626,507
1874	120,447,926	1880	298,436,661
1875	102,449,496	1881	225,851,919
1876	147,303,426	1882	163,150,040
1877	145,887,204	1883	175,317,229
1878	234,841,745	1884	158,500,000

The larger part of the increase of 152½ millions of bushels (104 per cent.) in the exports from 1877 to 1880 was made at one leap, from 1877 to 1878, when the gain was 89 millions. The decrease since 1880 (140 millions) has been almost as great as the increase after 1877, and most of it was made in two years. It is hard to realize that our grain exports this year have been almost as small as in the centennial year.

The bushels exported per 1,000 inhabitants have been:

1879.	1880.	1881.	1882.	1883.	1884.
5,560	5,950	4,358	3,040	3,172	2,783

Thus the exports per inhabitant this year were not half as great as in 1880, 12 per cent. less than last year, and less than in any other year since 1875.

The *value* of the total grain and flour exports for the eleven months ending with November has been:

1880.	1881.	1882.	1883.	1884.
$257,310,616	$210,318,432	$165,591,075	$159,739,456	$131,180,475

The value of the exports per 1,000 inhabitants has fallen from $5,130 in 1880 to $2,887 in 1883 and to $2,480 this year. This decrease of $126,000,000 in the value of a leading export since 1880 could not fail to be felt.

As the exports in the first half of the year are wholly of the previous year's crop, we shall see better the effect of each harvest by examining the exports for the five months ending with November, the values of which have been:

1880.	1881.	1882.	1883.	1884.
$134,953,991	$98,337,515	$100,734,766	$74,590,521	$64,037,904

The decrease is less in this latter period than in the first half of the year. It has been made greater by the very low prices of wheat and flour.

The cotton marketed since August (the crop year) down to Dec. 19 has been, in bales:

1879.	1880.	1881.	1882.	1883.	1884.
3,433,000	3,064,000	3,466,000	3,658,000	3,674,069	3,729,548

Thus though the crop is perhaps lighter this year than in any other reported here, the quantity marketed is largest this year. But a corollary of this is that the amount remaining to be marketed at this time must be extraordinarily small (or that *Bradstreet's* estimate of this year's crop is too small).

The surplus remaining at this time, according to the accepted figures for production, has been as follows.

1879.	1880.	1881.	1882.	1883.	1884.
2,324,000	2,925,000	1,770,000	3,334,000	2,040,000	1,690,000

The quantity this year is 17½ per cent. less than last year, and only about half as great as in 1882, and it is unfavorable for the Southern railroads.

The very prosperous years, 1880, etc., were preceded by a great increase not only in grain and cotton production, but in the number of hogs packed. From 1878 to 1880 the increase was 50 per cent., but there has been a large decrease since, as follows, the

figures being the numbers packed for the year ending with October:

1879-80.	1880-81.	1881-82.	1882-83.	1883-84.
12,274,349	11,723,145	8,972,602	9,903,040	9,429,768

The decrease since 1880 23 per cent. The changes have been small for three years.

The shipments of anthracite coal from the mines for the 11 months ending with November and also for the four months then ending, have been for eight years, in tons:

Year.	11 months.	4 months.	Year.	11 months.	4 months.
1877..	18,821 378	7,312,098	1881..	26,100.763	11.784,324
1878..	16.152,525	6,654,088	1882..	27.085,442	11,767,536
1879..	24,469,939	10,570,277	1883.	29,463,065	12,972,468
1880..	21,942,560	10,415,280	1884..	26,998.418	11,389,624

There was a tremendous increase when manufacturing industries became active after 1878, but the gain was made chiefly in a single year, and in spite of the great extension of manufactures and the rapid growth of population after 1879, the increase in anthracite production was quite moderate—less than an average of 5 per cent. yearly till the maximum production was reached last year. The decrease of 8 per cent. this year leaves the production nearly the same as in 1882 and larger than ever before, but it is felt the more because the capacity for producing and still more for carrying had been increasing, and the conditions compelled lower prices and lower rates for carrying.

The shipments since July are given to show what the recent tendency has been. Two-thirds of the decrease for the eleven months occurred in these four months; that is, for the first seven months of this year the decrease was 5½ per cent.; for the next four months, 12¾ per cent.; indicating that the demand has lessened recently, unless the production was excessive in the latter part of the last year. This year the production for the four months was nearly the same as in 1881 and 1882.

The shipments of iron ore from Lake Superior have been:

Year.	Tons.	Year.	Tons.
1878	1,101,206	1882	2,810,980
1879	1,303,679	1883	2,262,134
1880	1,850,625	1884	2,390,605
1881	2,225,087		

Thus the shipments this year were 5½ per cent. more than last year, 15 per cent. less than 1882, 7½ per cent. more than in 1881, and much more than in any previous year, in spite of the bad condition of the iron trade.

Receipts of lumber at Chicago for five successive years have been, in *thousands* of feet:

Year.	M. ft.	Year.	M. ft.
1877	1,066,452	1881	1,878,922
1878	1,180,566	1882	2,117,545
1879	1,469,878	1883	1,909,910
1880	1,561,779	1884	1,830,000

Down to 1878 the business had been nearly stationary for ten years. The table shows the whole rise, and the recent decline, which makes the receipts this year 4 per cent. less than last year and 13½ per cent. less than in 1882, but much larger than in any year previous to 1881. A small decrease coming after so rapid an increase is severely felt.

The miles of railroad completed in the United States during each of the last eight years has been:

1878.	1879.	1880.	1881.	1882.	1883.	1884.
2,916	4,570	7,174	9,789	11,596	6,753	4,350

The mileage for this year is partly estimated and may be considerably in error, but there is no doubt it is much less than in any year since 1879, when railroad construction had but begun to revive. The construction this year, however, makes an addition of about 3½ per cent. to the mileage of the country, which is more than the increase in population or area under cultivation. The railroad mileage completed at the close of each of the last seven years has been:

1878.	1879.	1880.	1881.	1882.	1883.	1884.
81,774	86,497	93,454	103,242	114,838	121,592	125,942

Since 1879 the increase has been 39,445 miles, or 45½ per cent., and here we have a sufficient explanation of anything that may be unsatisfactory in the present condition of railroad business.

The number of inhabitants, of acres in grain and cotton, of bushels of grain and bales of cotton produced, per mile of railroad have been as follows for the last six years, in all cases taking the mileage and population at the close of the year and the crops, etc., of the previous summer:

	Population.	Acres.	Bu. grain.	Bales cotton.
1879	581	1,565	31,600	67.73
1880	545	1,466	28,932	70.53
1881	509	1,359	19,804	52.65
1882	473	1,236	23,405	50.18
1883	466	1,204	21,563	47.00
1884	450	1,202	23,590	43.04

This further shows why the railroads are not doing so well as in 1880 and thereabouts. Since 1879 the decrease in the population, etc., to support each mile of railroad has been:

	Population.	Acres.	Bu. grain.	Bales cotton.
No.	131	363	8,010	24.7
Per cent	22.6	23.2	25.4	36.3

There has thus been a decrease of more than one-fifth per mile of railroad in these principal ultimate sources of supply of traffic to the railroads.

The comparative importance of the freight and live-stock shipments from Chicago and the East is shown by reports for the period from June 24 to Dec. 16, during which 1,182,277 tons of freight and 364,777 tons of live stock were forwarded—3¼ tons of freight to one of live stock, dressed beef being included with live stock. At the current rates, however, the live stock pays 60 per cent. more per ton than the chief freight, and if those rates had been obtained the live-stock shipments for this period would have yielded about $2,900,000; the freight something more than $6,000,000; so that the live stock yields nearly half as much as the freight. The cost of carrying live stock is doubtless greater; yet at current rates it may be that the profit per ton of live stock is twice as great as the profit on freight. Probably, however, there are few or no other places where live stock forms so large a proportion of the total business, though it may form a large proportion at St. Louis, where the other shipments are not one-fifth of the Chicago shipments. Of the east-bound shipments over the trunk lines, there is little more than one ton of live stock and dressed beef to five of freight.

The meeting of authorized representatives of the New England railroads held in Boston Dec. 16, to consider what action should be taken concerning the adoption of safety car couplers came, as might have been anticipated, to no positive conclusion, but ended its deliberations by a resolution requesting the Executive Committee of the Master Car-Builders' Association to devise some means for calling a national convention of representatives of all the railroads of the country, with power to act.

On the first informal ballot, as to what coupler was preferred, in which each representative was allowed one vote, the Ames led decidedly, having 8 votes out of 14, the United States having 3, the Cowell 2 and the Janney 1 vote, respectively. On the ensuing formal ballots, based upon number of cars represented, the Ames lost this preponderance, receiving throughout the ensuing ballots 22 votes. On the second formal ballot the Hilliard, which received no votes, and the United States, which received 6, were dropped from the list, the votes so dropped being transferred (with one vote not previously cast) to the Cowell coupler, giving it also 22 votes. The Janney coupler received throughout 11 votes, and on a motion being made and carried to drop the Janney also from the list, as being the lowest of the three, the votes so dropped were not cast at all thereafter, leaving the Ames and Cowell a tie at 22 votes each as before. The convention then gave up the attempt to agree in positive action and passed the resolution before referred to.

Chicago through shipments eastward of flour, grain and provisions for the week ending Dec. 20 were 53,032 tons. They have heretofore been reported since March incompletely, but both through and local freight were included, therefore the apparent decrease from the 65,356 tons reported for the week to Dec. 13 may be no decrease at all. For six successive years the through shipments in this week have been:

1879.	1880.	1881.	1882.	1883.	1884.
42,182	59,150	54,801	60,294	44,480	53,032

The shipments this year were 19 per cent. more than last year—when, however, some shipments made at the rates prevailing before December may have been excluded—but they were less than in any of the three previous years.

Comparisons with the shipments of previous weeks of this year are vitiated by the inclusion of the local shipments in them. The percentages are not so far wrong as the tonnages would be, but in examining the following it should be remembered that in all weeks but the last the local shipments were included, and that they are not in all cases in proportion to the through freight, and that it is the through freight only which is pooled:

Per cent.	Week ending					
	Nov. 15.	Nov. 22.	Nov. 29.	Dec. 6.	Dec. 13.	Dec. 20.
C. & G. T.	5.5	4.8	8.4	14.2	15.4	20 2
Mich Cen	27.4	27.6	27.3	24.8	24.0	24.3
Lake Shore.	17.4	20.4	20.4	7.3	13.9	11.6
Nickel Plate	12.8	16.0	14.6	12.7	13.9	9.2
Ft. Wayne	11.4	11.0	9.7	18.6	12.0	14.4
C., St. L. & P.	7.7	7.5	4.4	6.9	4.8	7.2
Balt. & Ohio	5.7	4.7	3.2	6 4	5.6	7.4
Ch. & Atlantic	12.5	8.0	12.0	9.1	10.3	5.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

The Chicago & Grand Trunk seems to be collecting the debts due it, but it is noticeable that it gets nothing from the Michigan Central. Percentages of tonnage are not an exact criterion of the position of road, however, as the apportionment contemplates a distribution of the earnings in accordance with it, and some roads carry much more high-class freight than others. Thus the two Pennsylvania roads and the Chicago & Grand Trunk are the chief carriers of provisions, which pay higher rates than flour and grain, and the Michigan Central and the Chicago & Atlantic carry flour and grain chiefly. Actually the balance due by any one road to the others is not now a very large sum, and the Fort Wayne is "over" and not "short," though the other Pennsylvania road is short more than the Fort Wayne is over. The shortage of the Chicago & Grand Trunk is comparatively small.

An obstacle to the prompt payment of balances at frequent intervals is the unsettled condition of the apportionment. Judge Cooley, as arbitrator, is to review the award made last summer by Messrs. Adams, Riddle and Gault, and not only that, but he is to decide from what date his award (if he makes any change) is to take effect. It may go back to Jan. 8, and may begin with August. This matter is now pending. It is agreed that Judge Cooley shall have two "assessors" to advise him, and Mr. Joseph F. Tucker, late Traffic Manager of the Illinois Central, has been selected as one of them, and he and Judge Cooley will select the other. The arguments have not been submitted yet, and when the award is made it may date back more than a year.

The American Society of Civil Engineers contemplates two changes in its manner of conducting its conventions, which seem worthy of note. The first is to require all papers which are to be presented at the conventions (and presumably reports of technical committees as well) to be handed in to the Secretary at least 40 days in advance, in order that abstracts may be prepared and sent to each member to enable him to prepare a discussion should he so desire. In this way it is hoped that the interest and value of the discussions will be greatly increased, and the weariness avoided of listening to abstract theoretical discussions which cannot be intelligently followed by the ear alone when so delivered.

The second measure is designed to relieve the Society from an unnecessary burden of obligation for entertainments, excursions, "banquets," and the like, which the members feel bound to attend in courtesy to their entertainers, but which are not generally felt to be the most profitable and enjoyable use of the limited time available. To this end it is proposed to abandon the system of accepting "invitations," of a more or less formal character, to hold conventions in certain large cities, but to go instead to some large summer resort—the more retired the better—provided it offers adequate hotel accommodations, where the time not occupied by the sessions of the convention can be devoted to rest, or informal social intercourse, instead of to sight-seeing or formal entertainments. Many feel that this measure will greatly add to the attractions of the convention.

The changes proposed have been recommended by a committee specially appointed for that purpose, after the last convention at Buffalo had brought the defects of the present method forcibly to the attention of members. They are now offered to members with the approval of the Board of Direction, and if approved at the coming annual meeting of the Society will govern the arrangements for next year's convention. The rule requiring all papers to be printed in advance, in abstract at least, has much to recommend it to such organizations as the Master Mechanics' and Master Car-Builders' Associations, in which reports, often embodying important practical propositions, are presented to members so short a time before the discussion takes place, as to make many indisposed to take part in it, for lack of the requisite time for consideration.

What confusion the Germans escaped from by adopting the metrical system is illustrated by a plate which forms the frontispiece of Heusinger von Waldegg's "Railroad Engineer's Almanac." This is a sort of universal rule, having broad lines divided into millimetres and centimetres at the top and bottom, and between them, and separated from each other by millimetre scales, no less than *thirteen* different inches, all of which, or all but one, have been used in Germany, while constructions made by all these measures are doubtless in use there still. These inches are the Baden, the Bavarian, the Brunswick, the Hamburg, the Hanover, the Hesse-Darmstadt, the Hesse-Cassel, the Prussian, the Saxon, the Wurtemberg, the Austrian, the Parisian, and the English. The plate also indicates that the old measures must often be used still, else there would be no need of it in an almanac. And this is necessarily so, as structures last and must be cared for and repaired, though standards change.

Record of New Railroad Construction.

Information of the laying of track on new railroads is given in the present number of the *Railroad Gazette* as follows:

Baltimore & Ohio.—Track is laid on the *Philadelphia Branch* from Newark, Del., east to the Maryland state line, 3 miles.

Galveston, Sabine & St. Louis.—Extended southward to Martin's Creek, Tex., 5 miles.

Houston East & West Texas.—Extended from Nacogdoches, Tex., northeast to Sterne, 12 miles. Also, on the eastern end, southwest 2 miles, to a point eight miles from Shreveport, La. Gauge, 3 ft.

Wisconsin Central.—This company's *Minnesota, St. Croix & Wisconsin* line is extended from the St. Croix River west to St. Paul Junction, Minn., 19 miles.

This is a total of 41 miles of new railroad, making 3,693 miles reported to date for the current year. The total track reported laid to the corresponding date for 13 years past is as follows:

	Miles.		Miles.
1884	3,693	1877	2,019
1883	6,020	1876	2,278
1882	9,922	1875	1,333
1881	7,870	1874	1,844
1880	6,139	1873	3,630
1879	3,801	1872	7,160
1878	2,203		

These statements include *main track only*, no account being taken of second tracks or other additional tracks or sidings.

The new track reported to date is thus less than in any year since 1878. It is about 60 per cent. of that reported

for 1883 and 37 per cent. of that for 1884. More detailed information yet to be received will probably make this year's work not far from 4,000 miles.

NEW PUBLICATIONS.

Kalender für Eisenbahn-Techniker.—The "Railroad Engineers' Almanac," compiled yearly by the veteran technical railroad author of Germany, has made its appearance for 1885—a pocket-book with a memorandum diary, postal and telegraph regulations, a few pages of cross-section paper, and then 192 pages of engineering table-book information, and a folding railroad map of Germany. It is accompanied by an unbound "supplement," which has full lists of the officers of German railroads and of the locomotive and car-shops in Germany and Austria, which may be convenient for some American manufacturers and inventors to have.

The Elements of Railroading.

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VII.—LOCOMOTIVES.

Upon every railroad there is, or ought to be, one or more master mechanics, whose duty it is to look especially after the design, construction and repairs of these engines; there are, besides, manufacturers and inventors devoted to their improvement, and most complete books concerning their principles of action and details of construction. Nothing will be attempted here, therefore, beyond some considerations respecting the use of them after they are ready for the road, and as to the selection of them when they are to be built or purchased.

During the first half century of railroading, the locomotive was regarded with some superstition, if not with awe, by those who ought to have become too familiar with it to be its dupe; it was the fashion to marry it to one man for life, or for so long as the pair could agree together; no one but the familiar engineer was thought to understand the caprices of the petted machine; no one else could get her to pull a heavy load or a quick train; he only knew her secret springs of action, and when he was tired, the locomotive stopped.

Scientific men wrote about the fatigue of metals, and the unscientific believed them to mean that continuous effort was bad for the engine, even though it showed no symptoms of prostration. In consequence of these ideas, dimly entertained, no doubt, or, like other superstitions, accepted without consideration from the earliest habit, the locomotive worked less than half the time, on the average; the remainder of the day it was being polished and wiped and screwed up, and decorated with fancy pictures in the cab, and such other fanciful things as its betrothed engineer could pick up.

These foolish notions found defenders, for a long time after they were seen by sensible men to be mistaken, on the ground that the sentimental regard of the engineer, for his own engine, would maintain it in more perfect condition than could be attained in any other way.

The locomotive is a machine of iron and brass, without sensibilities, and may be run day and night perpetually (except for a little wiping) until worn out or repairs are necessary. To save the investment of capital, we should get every hour's work out of it that we can; it should be maintained in such good order that any man can run it successfully, who can run a locomotive at all. Unless in case of necessity upon the road, the runner should have nothing to do with the adjustment of its brasses or with its repairs; it would be preferable that he should not know upon which locomotive he was to go on the road; he would soon find himself compelled to be the better engineer. It is doubtless comfortable for him to run upon one particular train, to learn all its stops and its schedule by heart, and those once well learned, to have little else to do than to open and shut the throttle; yet this is scarcely fair sometimes towards the other men; and there is no doubt that rotation, first in first out, will procure the most wide-awake set of men, the smartest competition between them, the fairest apportionment of labor, and the surest readiness for every emergency. In the very first of the trials of this system, there will be some men who will not do perfectly well with trains which they have never run before; but in a brief period the strife for precedence in credit will make every man ready for every train.

It must be a familiar experiment with almost all superintendents, to have replaced an old passenger man, who failed to make time with the express, by an active young freight runner, who would make up something with the same engine.

A false notion still prevails with regard to the amount of wiping which is necessary for an engine. Experiment has demonstrated that if the guides and more exposed bearings are wiped once in 100 miles, the engines suffer no injury if run continuously 500 miles without general cleaning; to all appearance they might have been run 1,000 miles. The saving to be made by less wiping is not an important one; it is the saving in the time of the engine, which is of great value. Thirty years ago, 100 miles was commonly supposed to be as far as an engine could be prudently run without being laid off, and the runs were generally made shorter than this; they are fixed now according to the endurance of the men, or the length of the divisions of the road, or the location of the engine-houses; when there is need of all the engine-power available upon the road, there is no reason why one engine should not run continuously over several divisions, changing men as often as necessary. As to men, we know about how many miles or how many hours of running they will safely bear; but as to a locomotive, we do not know its limit of endurance, which depends somewhat upon the dustiness of the road-bed, the speed of the train, the quality of the oil used, perhaps; but can be readily determined for each road by a little experimenting, with unprejudiced observation. The improved condition of the track, and also the vastly improved construction of the movable parts of the locomotive, have altered its demands for readjustment, so that it may be run much farther than it could under the unfavorable circumstances which once prevailed. To increase its duty in a given time, is one of the readiest means of lessening the investment of capital, upon which it is already difficult to pay the charges. To wear out old locomotives by honest work and to replace them with modern improved machines, is surely better than to give them half or less than half the service to do, which they might render if kept constantly employed; and as they are capable of much longer periods of labor than those who run them, the only way to accomplish this is by divorcing the engine from its runner, making it ready to pull a train whenever there is one to go. There will be, on most roads, isolated instances of branch trains or remote switching engines, upon which the men cannot be frequently rotated; yet they should be often changed, to prevent them from becoming slothful and indifferent, which is more or less the effect upon every person of a monotonous life.

The most satisfactory results of this mode of operating the locomotives will be perceived when they are of few classes, alike in their most important features, and all in a first-rate condition for use. It is very unwise to keep any engine at work which is not in good order, for it is not only wearing itself out unduly, but is causing money to be spent in extra fuel, in tinkering and in delays, which were better expended in restoring the machine to the best condition of which it is susceptible.

If the engines are out upon the road, earning money, they will not need so much engine-house room as if they must be housed during the half, or a greater part, of their existence. When there was much brass to be *shined up* on each engine, and a great area of decorative painting to be wiped off upon each tender, it was desirable that the fireman or the wiper should be under cover while engaged in cleaning the machine; now that the engines are built more for business and less for show, it is only needful that they shall stand long enough over the steam pipes, in cold weather, to have the machinery well cleared of ice, so as to be thoroughly wiped; they will not then suffer any damage from exposure, if properly attended to by the hostler.

It is found to be better for boilers to be kept constantly warm than to be frequently cooled, because when cooled they suffer a contraction and consequent strain; it will also result in a saving of fuel to keep an engine, which comes off the road hot, from growing cold, unless it is to stand too long; for the quantity of coal required to fire up a cold boiler will keep a hot one warm a long time. The expense of keeping an engine fired up, out of doors, in cold weather, is not very great, if it stands still, as it may do if provided with injectors; it ought not to stand very long, however; it should be at work. Of course, there should be ample room in round-houses and in shops to make all repairs promptly, with the men and machines comfortably sheltered.

Upon most railways the locomotives have been purchased from several manufactories at various periods, and differ from each other in every possible way, so that there are only a few of any one pattern, which compels a very large stock of the smaller parts to be carried, in order to be ready to make slight repairs without delay. Opportunities occur when there is a considerable break-down, or when an engine goes into the shop for general repairs, to make alterations which will bring it into conformity with the larger number of locomotives, and it is desirable to make such changes at a comparatively large cost, for the sake of finally bringing about uniformity.

Nothing is more important upon a railroad than interchangeability of parts in everything which is subject to wear; whether pertaining to pumps, to tracks, to cars, to signals or, chief of all, to engines. In equipping a new road, it would be inexcusable not to decide upon certain standards and to adhere to them, no matter where the locomotives were to be manufactured. If it were preferred to have them built by several makers, the patterns prepared by one could be duplicated and sent to the others, so as to secure, if not perfect interchangeability, yet a sufficiently near approach to it to admit of the substitution of standard parts, when any renewal is required, without extra cost.

There is more frequent necessity for the renewal of the smaller parts of a locomotive than there ought to be; the breaking down of the engine while upon the road occurs oftener than is creditable to our constructors or to our master mechanics. It is proper for the superintendent to expect, when a machine is sent out to take a train, that it will run through, without hindrance from defects in the machinery. It is said to be a very rare occurrence in England or in France to have an engine disabled upon the road, and this is affirmed upon the best authority; probably when anything breaks there from not being strong enough, they renew it with something stronger, and when any part wears rapidly they renew it before it is entirely worn through. It seems, from the continual break-downs, as if no such lesson was taken to heart upon many American railways. Some improvement may be accomplished in this respect by keeping a careful account of the break-downs which occur, and of the parts which fail; an interested master mechanic will require all the broken parts to be sent to him and will gather instruction and warning from them. When engines are bought from the manufacturers there are sometimes more frequent failures of small parts than upon the engines which are built in the shops of the railroad company, probably because such work is done by the piece in the manufactories and by the day in most company's shops. The manufacturers doubtless secure the best work they can. It is for their interest, as well as incumbent upon them as honorable dealers, to do so, but their inspectors may not always be so reliable as they presume them to be. On this account, when engines are being built by them for a railway company, it is advisable that it should send its own inspector to supervise their construction. It is likely that he will find many things to correct and to object to, as he would even in the company's shops; so many defects as he prevents there, so many less will there be to remedy after the engines are upon the road. There are frequently two or more modes of doing the same work as to which the manufacturers may be indifferent, but as to which the company's master mechanic or designer may have decisive reasons for a choice; at such times, the presence of the inspector is an advantage to the manufacturers, as it surely will be, also, if he in any respect secures a better engine than would otherwise have been obtained.

Until recently, there has existed a prejudice among many master mechanics against loading the freight engines to their maximum capacity, arising partly from a fear that the engines would be more rapidly worn out than if they hauled only such trains as they could easily pull through, and partly from the faulty manner in which the account of the performance of engines is usually kept. Careful accounts have proved that the repairs per ton hauled are not increased, but on the contrary are much diminished by loading the engines with all they can possibly draw; indeed, when the repairs are calculated by the mile run they are not sensibly increased by the greater loads. The quantity of fuel consumed per mile, not per ton, is of course increased, and as the reports of fuel burned are rendered by the mile, the master mechanic who is doing the best work in this respect, may compare unfavorably with one whose engines are hauling fewer tons over similar grades. Because of this imperfect method of making the locomotive reports, those of one road, or of the several divisions upon any road, cannot be compared with any justice, unless by some one who is acquainted with such details as the grades upon each division, the quality of the fuel and the speed of the trains, none of which find place in the published returns. Such comparisons would be so desirable, if they could be generally made, that the master mechanics could undertake nothing at their conventions which would be more useful, than to devise a system of accounts by which the performances of locomotives, upon their several railroads, could be really compared.

It has resulted satisfactorily upon the roads where the experiment has been tried, to pay premiums to the engineers and firemen for the savings which they effect when compared with others, or with a standard of performance which is fixed as a reasonable one by the officers of the road. The cost of fuel for engines is from 5 to 6 per cent. of the total of the earnings, or from 9 to 10 per cent. of the total of expenses, upon the average of the railroads; and it is of very great importance, therefore, to secure economy in its consumption by all the means which are possible. It is not difficult to put into effect a method by which it may be certainly determined whether one man is burning more than another or more than the average; and if a premium is paid for unusual economy, the greater number of the men will strive to earn it, and those who succeed will fairly deserve to receive it; perhaps the spirit of emulation which is excited, and which makes honorable mention more precious than money, may have even more effect than the hope to gain a pecuniary reward.

The combustion of coal in the furnaces of locomotives has been the subject of very elaborate investigations and experiments, and is probably fairly well understood as to its theory; to secure the best results in practice has puzzled the best wits in the engineering profession; nevertheless, it is the custom to send as firemen upon the locomotives the least informed class of men, who have had no opportunities to learn anything of their business, and who get only the very slightest hints from the engine-driver, who is presumed to know, and to instruct his fireman, how to fire. The art of *stoking*, as it is called in England, has there been carried to such a refinement that the most expert stokers, who are employed to fire the agricultural engines during the trials, get very high wages, as the foremost jockeys do; a fact which is cited here to indicate of how great value, in firing, a knowledge of the art may be. A plain, brief manual upon this art, which would enlighten the enginemen and firemen as to what is going on in the fire-box, and how to insure the best results, would be of inestimable value to the railroads of this country; while this need remains unsupplied, there should be instruction of the men practically by the most expert firemen upon the road, or who can be found anywhere, who generally know more about it than the average engine-man, and who should be detailed to ride a few trips with every new man, and during their spare intervals with the older men, to teach them all they can as to saving fuel. The nuisance of smoke, upon roads which burn soft coal, may be mitigated by judicious firing.

The best color for locomotives and tenders is black; when the paint is defaced it is most easily matched, it is more enduring than any other and can be mixed and applied with the least demand for skilled labor; to the accustomed eye, it looks the best of any. The less polished work of brass or of iron upon the engines, the less rubbing and care will be required to keep them bright. There has been a great reduction effected in the labor of firemen and wipers already, by painting many parts which were formerly kept bright, yet there is room to carry the reform still farther.

Not much valuable advice can be given as to the best model or pattern of engine to be built or purchased without a knowledge of the conditions to be fulfilled, which depend upon the characteristics of the road, the kind of service for which the engine is wanted, and the amount of traffic to be provided for. It may be safely affirmed, that for any service it is better to have engines of more than the necessary power, rather than those which are too feeble, or only of just sufficient power; for there will be occasions, as in snow storms, when it will require the utmost efforts of the locomotive to pull such a train as it is accustomed to haul with ease. It would not be wise, however, to provide a large surplus of power in any locomotive which will have only a certain determined work to perform, simply to meet occasional exigencies; yet as a general rule, trains upon any road increase in weight, and in speed, and in number. A large boiler produces steam more cheaply than a small one which is also favorable to the choice of a heavier rather than a lighter engine.

It was once supposed that locomotives for very fast express trains must be limited to one pair of drivers; the improvements in mechanical work have made it possible to run the fastest trains in the world with two pairs of drivers coupled; and some of the fastest trains in this country are now run with Mogul engines, which have three pairs of drivers coupled. The power of a locomotive is limited by the amount of adhesion to the track which is obtainable through its drivers, and because that adhesion is due to the weight borne by them, which in its turn is governed by the consideration of what can safely be borne at one point by the rail or the wheel, it is apparent that the maximum weight of an express train has been increased about threefold by this advance in mechanical construction.

It should be always remembered that the cost of running a very heavy train is but little more, comparatively, upon the same road than the cost of hauling one which is much lighter, and the cost per ton per mile is rapidly reduced by an increase in the capacity of the locomotive. This has led to a very great addition to the weight and power of engines lately built for roads of large traffic, especially when such roads have also heavy grades which must be surmounted. There is no longer any mechanical objection to an increase in the number of coupled drivers sufficient to carry the entire weight of the engine upon them, so as to avail of it all for adhesion to the track.

The weight of the engines which may be employed upon any road is or should be limited by the load which the bridges and other structures will carry, without improper strain—a limitation which has not received always the consideration which it merits. CHARLES PAINE.

Standard Dimensions and Woods of American Cross-ties.

The tables presented herewith show the existing American practice in respect to cross-ties, so far as it can be shown by reports covering 90,900 miles out of 121,592 in operation in the United States. The information was obtained from the responses to a circular of inquiry as to existing practice in several details of track work sent out from this office some months since; as stated in our number for Dec. 5 last, where the variations in practice as to laying tracks with even or broken joints were presented.

In order properly to present existing practice as to cross-ties, the subdivision of the United States into geographical sections has been slightly varied from that used to show the practice as to rail-joints. The total mileage covered by the reports is also slightly different.

At the foot of the first and longest table herewith the total mileage operated in each section, according to the last (1884) issue of Poor's Manual, is approximately given. This, however, must be understood to be merely approximate for each separate section, as, for various reasons, but little respect could be paid to state lines in subdividing the country geographically, a difference of physical conditions being the more important consideration. In the many cases where long lines did not lie wholly in any one of the sections, no attempt was made, in general, to distribute their mileage to each accurately, but the whole of it was included in the section where most of it lay. The following notes, giving those facts covered by the reports which could not well be tabulated will assist in properly interpreting the tables and explaining these and any other seeming discrepancies:

NEW ENGLAND STATES.

The predominating wood for ties in New England (nearly one-half of all) is chestnut, about one-third being cedar and the remainder nearly all hemlock, 3½ per cent. only being of oak. The use of cedar ties seems to be confined mostly to the lines along the coast, the Old Colony, the Boston & Maine and the Maine Central, for example, being nearly all laid with cedar. Nearly half of the reported mileage of hemlock ties (212 miles) is of kyanized ties on the Eastern Railroad. The untreated hemlock ties of the Southeastern Railroad are reported to last about five years.

All ties in New England are reported to be 8 ft. long and in general 6 in. thick, the chief exceptions being two prominent lines, the Boston & Albany and the Old Colony, which use 7 in. ties, and the Southeastern, which uses 6½ in. The Boston, Hoosac Tunnel & Western explicitly leaves a latitude of an inch in thickness, specifying that the ties shall be "about" 6½ in. thick, "(not less than 6 nor more than 7 in.)," a latitude which practically exists, no doubt, quite frequently, and is also explicitly granted by some important lines further West, but which is rarely formally granted and which some lines seriously object to.

MIDDLE STATES.

The proportion of various woods for cross-ties in the middle states is very unequal even on lines near together. The use of chestnut and Georgia yellow pine is, to borrow the phrase from the weather reports, "central over New York City," from 40 to 80 per cent. of the ties in eastern New York being of chestnut and a smaller but still large proportion being used south of New York near the sea-coast. A considerable proportion of chestnut ties, sometimes as much as 25 per cent., is also used on lines in the extreme west of New York, Pennsylvania and Maryland. The use of hemlock is mainly confined to the central belt of New York and Pennsylvania, where it is very general, the proportion ranging all the way from 45 to 85 per cent. The Delaware & Hudson Canal Co. reports 90 per cent. of soft or other inferior woods, 45 per cent. being hemlock, against only 10 per cent of white oak. The New York, West Shore & Buffalo reports only 28 per cent. of oak ties, the remainder being chestnut, hemlock and yellow pine. From this it will be seen that the use of inferior ties predominates in New York state, while in the states further to the south the use of white oak ties is still general. Rudely separating the mileage, we have:

In New York ..... 4,945 miles with 42 per cent. oak ties.
In other middle states. ...9,164 " " 82½ " " " "

Even this is somewhat unduly favorable to average New York practice, since the total of oak is largely increased by what would appear to be special efforts to obtain oak ties by one or two large lines,—efforts which their extended mileage no doubt greatly facilitates.

SOUTHERN STATES.

The only timbers which appear to be used to any extent in the South are white or rock oak (in the interior) and long leaf, or so-called "Georgia," yellow pine (the best qualities coming from Georgia). These timbers appear to be esteemed as very nearly of equal value. Good heart pine, cut in fall or winter when the sap is down, is reported to last in gravel ballast from six to seven years, which, however, is a low average for oak in the North. One note says that "post oak is about 2 per cent., better than pine; white oak about the same." One curious note is that "cross-ties should always be used on the soil they grew in, as the timber is part of the soil and will last two or three years longer when so used. I have tried it."

The established lengths for ties are considerably longer than further north, partly, no doubt, because the gauge is 3½ in. wider, but also, probably, because the nature of the timber makes long ties more readily obtainable. Only 18 per cent. of Southern ties are so short as 8 ft., and 27 per cent. of them are 9 ft. long.

On the southern coast lines Georgia pine ties 9 ft. long by sometimes 6 but usually 7 in. thick and 9 to 12 in. wide may be said to be the standard. In Virginia and on the lines near the Allegheny Mountains, on each side, white oak ties 8½ ft. long and 7 in. thick decidedly predominate, few ties being so thin as 6½ in., and still fewer so thin as 6 in. The widths of face specified also appear to average wider than further north.

SOUTHWESTERN STATES.

In the region from Louisville and New Orleans west to Texas and New Mexico, white oak ties predominate to a somewhat surprising extent, the lines along the coast only using Southern pine or cypress very largely. The Missouri Pacific system and most lines in interior Texas are almost exclusively laid with white or post oak. About one-third of the Atchison, Topeka & Santa Fé mileage is laid with pine. Many of the companies, as might be expected from the scarcity of wood, admit much latitude in dimensions, the Atchison line, for example, receiving oak ties "not less than 6 in. nor more than 7 in. thick, and not less than 8 ft. nor more than 8 ft. 6 in. long," while pine ties must be "not less than 7 in. nor more than 8 in. thick," with the same latitude as oak ties in length. Two lines report large quantities of creosoted and other preserved ties. The Houston & Texas Central reports some 60 miles (8 per cent. of mileage), laid with pine treated with creosote, and 15 miles (2 per cent.) with pine treated with chloride of zinc. The St. Louis, Iron Mountain & Southern reports "90 miles of gum and other soft woods treated [by what process not stated], and put in track three years ago. All in sound condition at present, and to all appearance will last at least three years more, showing now no sign of decay."

In length of ties, Morgan's Louisiana & Texas Railroad shows the extreme of the tendency in the South to the use of long and thick ties, a large part of its ties being 7 by 10 in. section by 10 ft. long, some, however, being only 9 ft. long. The bulk of the ties in this section are about equally divided between 8 ft. and 8 ft. 6 in. length, about one-eighth being 9 ft. long. Most of the latter (about 1,600 out of 1,900 miles) are on the Cincinnati Southern and the Louisville & Nashville systems. Both of these lines, however, use shorter ties also to a very large extent. The Cincinnati Southern uses 8 ft. ties on rock ballast and 9 ft. on gravel ballast.

In thickness, 7 in. will be seen to be the predominating rule throughout the Southwest, only 25.1 per cent. of those covered by the reports being as thin as 6 in. Nearly all of these lie in a narrow belt from Kentucky and Missouri westward to New Mexico. South of this belt practically all ties are 7 in. thick.

NORTH OF THE OHIO.

The only wood in use for main track cross-ties in Ohio, Indiana, and Illinois may be said to be white oak, the small proportion of other ties reported (only 460 miles in 13,008) being in some cases expressly, and in others impliedly, restricted to ties used on sidings. Considerable numbers of black walnut ties are reported as still in use in Indiana. It can hardly be doubted that there is in fact a larger proportion of inferior ties than appears upon the face of the reports, taking main track and side track together, since many statements of woods used appear to have been made with reference to main track only; but the proportion of the inferior woods in main track would appear to be very small indeed, and far outweighed by the proportion of good oak ties in sidings, so that there would appear to be many more oak ties in use than is required to lay all main track with oak alone.

In Michigan, the use of oak is much less general, only a little over half (53.7 per cent.) of the mileage reported being laid with it, the remainder being mostly hemlock and cedar. Many of the roads through central and northern Michigan have few or no oak ties.

In length of ties, roads in Ohio and Indiana use chiefly 8½

KINDS OF WOOD IN USE.

Table showing the Total Mileage reported as laid with Cross-ties of various Woods, for the whole of the United States, and by Geographical Sections.

KINDS OF WOODS.	Total U. S.	NORTHEAST. New Eng.	NORTHEAST. Middle.	SOUTH. Va., etc.	SOUTH. So. coast.	SOUTH. So. Int'r.	SOUTH. S. W.	NORTH CENTRAL. Ohio, Ind., Ill.	NORTH CENTRAL. Mich.	NORTH CENTRAL. N. W. of Chic.	FAR WEST. Far W. Int'r.	FAR WEST. Pacific.
White oak	49,663	126	9,625	2,506	789	2,211	10,602	12,548	1,612	8,767	.....	877
Cedar	8,871	1,177	312	.....	.....	56	56	157	204	6,690	.....	219
Yellow pine	7,399	.....	568	.....	2,632	657	3,542	.....	.....	.....	.....	.....
Northern pine	5,895	.....	.....	.....	.....	.....	.....	.....	.....	275	2,295	3,325
Hemlock	5,002	564	1,238	.....	.....	.....	.....	46	1,170	1,984	.....	.....
Chestnut	3,765	1,613	2,152	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fir	1,437	.....	.....	.....	.....	.....	.....	.....	.....	.....	499	938
Spruce	1,385	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,385	.....
Cypress	823	.....	.....	190	51	.....	582	.....	.....	.....	.....	.....
Miscellaneous hard woods	524	.....	159	.....	.....	110	26	229	.....	.....	.....	.....
Miscellaneous soft woods	520	6	.....	.....	38	.....	90	28	21	281	.....	56
Total	85,284	3,486	14,054	2,696	3,510	3,034	14,898	13,008	3,007	17,997	4,179	5,415
Not specified	5,616	170	55	.....	.....	114	1,561	2,150	1,566	.....	.....	.....
Total mileage of reports	90,900	3,656	14,109	2,696	3,510	3,148	16,459	15,158	4,573	17,997	4,179	5,415

PERCENTAGES

Deducted from the preceeding table, showing the proportion of the mileage reported for the United States, and each section laid with cross-ties of each of the various woods.

WOODS.	Total U. S.	NORTHEAST. New Eng.	NORTHEAST. Middle.	SOUTH. Va., etc.	SOUTH. So. coast.	SOUTH. So. Int'r.	SOUTH. S. W.	NORTH CENTRAL. Ohio, Ind., Ill.	NORTH CENTRAL. Mich.	NORTH CENTRAL. N. W. Chic.	FAR WEST. Far W. Int.	FAR WEST. Pac'fic.
White oak	58.2	3.6	68.5	93.0	22.5	72.9	71.2	96.4	3.6	48.7	.....	16.2
Cedar	10.4	33.8	2.2	.....	.....	1.8	0.4	1.2	6.8	37.2	.....	4.0
Yellow pine	8.7	.....	4.0	.....	75.0	21.6	23.7	.....	.....	.....	.....	.....
Northern pine	6.9	.....	.....	.....	.....	.....	.....	.....	.....	1.5	54.9	61.4
Hemlock	5.9	16.3	8.8	.....	.....	.....	.....	0.4	38.9	11.0	.....	.....
Chestnut	4.4	46.3	15.4	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fir	1.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.0	17.4
Spruce	1.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	33.1	.....
Cypress	1.0	.....	.....	7.0	1.5	.....	3.9	.....	.....	.....	.....	.....
Miscellaneous hard woods	0.6	.....	1.1	.....	.....	3.7	0.2	1.8	.....	1.6	.....	.....
Miscellaneous soft woods	0.6	.....	.....	.....	1.0	.....	0.6	0.2	0.7	.....	.....	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE.—These tables, giving the proportion of each of the various woods, are subject to the following sources of error, in addition to the general one that it is based in the main on the estimates of the proportion of each wood in the track, made by the managing officers in the maintenance of way department, and not upon accurate statistics of the proportion of each wood:

1. It appears probable, by comparisons of the various reports, that in many instances small percentages of inferior woods were neglected, especially when the ties were very nearly all of one wood.

2. On the other hand, it appears probable, by comparison of reports, that in some instances main track only was considered in estimating the percentage of each wood, while in other cases both main track and side-track were considered.

These two causes, on the whole, probably tend to balance each other, so far as the proportion of each kind of ties *in main track only* is concerned, giving, however, a slightly larger proportion of inferior woods than is true for main track only.

On the other hand, so far as respects the proportion of ties of all kinds in existence, on both main track and side track, the tendency of both these sources of error is to decrease the apparent proportion of the inferior woods. The table, therefore, may be considered as applying to main track only, but giving a slightly too unfavorable view of the character of the woods.

WOOD IN USE FOR CROSS-TIES IN THE UNITED STATES.

SIZES OF CROSS-TIES IN USE.

Table showing the total mileage reported as laid with cross-ties of various woods for the whole United States, and by geographical sections.

DIMENSIONS.	Total. U. S.	NORTHEAST. New Eng.	NORTHEAST. Middle.	SOUTH. Va., etc.	SOUTH. South coast.	SOUTH. South int'r.	SOUTH. South-west.	NORTH CENTRAL. Ohio, Ind., Ill.	NORTH CENTRAL. Mich.	NORTH CENTRAL. N. W. Chic.	FAR WEST. Far W. int'r.	FAR WEST. Pacific.
8 ft. ties:												
6 in. thick × 6	3,755	1,261									2,494	
6 in. thick × 7	2,769	144	500					55			1,685	1,385
6 in. thick × 8	31,517	451	4,413				2,651	4,434	757	14,820		3,994
6 in. thick × 9	1,145	258						552	335			
6 in. thick × 10	475	204			171				100			
6½ in. thick × 7	355							355				
6½ in. thick × 8	134							134				
6½ in. thick × 9	460	218			242							
6½ in. thick × 10												
7 in. thick × 7	1,721	875		846								
7 in. thick × 8	6,834	75					3,582			3,177		
7 in. thick × 9	2,808		2,224		134	125		325				
7 in. thick × 10	195		55			140						
8 in. thick × 8	300						300					
Total, 8 ft. ties	53,468	3,486	7,189	846	547	265	6,533	5,855	1,192	17,997	4,179	5,379
8 ft. 6 in. ties:												
6 in. thick × 7	63		63									
6 in. thick × 8	1,206		227	313			327	199	140			
6 in. thick × 9	923						923					
6½ in. thick × 8	2,191							2,191				
6½ in. thick × 9	142		30			112						
7 in. thick × 7	5,840		5,369	156				315				
7 in. thick × 8	8,477		663	1,381		2,657	1,123	2,633				
7 in. thick × 9	3,589				391		3,040	158				
7 in. thick × 10	922						922					
Total, 8 ft. 6 in. ties	23,333		6,352	1,850	391	2,769	6,335	5,496	140			
9 ft. ties:												
6 in. thick × 7	221								221			
6 in. thick × 8	1,877		68					500	1,309			
6 in. thick × 9	920				920							
7 in. thick × 7	145								145			
7 in. thick × 8	1,590						1,590					
7 in. thick × 9	2,650				1,542		180	928				
7 in. thick × 10	130						130					
Total, 9 ft. ties	7,533		68		2,462		1,900	1,428	1,675			
10 ft. ties: 7 × 10	130						130					
Misc. narrow-gauge ties*	307				110			161				36
Total U. S. reported	84,771	3,486	13,609	2,696	3,510	3,034	14,898	12,940	3,007	17,997	4,179	5,415
Not specified	6,129	170	500			114	1,561	2,218	1,566			
Total mileage of reports	90,900	3,656	14,109	2,696	3,510	3,148	16,459	15,158	4,573	17,997	4,179	5,415
Approximate aggregate of total mileage in operation	121,592	6,231	17,860	3,500	5,126	5,000	20,087	21,788	5,151	21,849	7,000	8,000

NOTE.—This table, as respects widths of face, is probably not entirely reliable, since the reports indicate an average instead of minimum width of face for hewn ties was recorded.

SUMMARY.

Showing the total mileage reported as laid with ties of various lengths and thickness only, neglecting the variations in width of face.

LENGTH AND THICKNESS.	Total U. S.	Northeast. New Eng.	Northeast. Middle.	South. Va., etc.	South. So. coast.	South. So. Int'r.	South. So. west.	No. Central. Ohio, Ind., Ill.	No. Central. Mich.	No. Central. N. W. of Chic.	Far West. Far W. Int'r.	Far West. Pacific.
6 in. thick	40,661	2,318	4,910		171		2,651	5,041	1,192	14,820	4,179	5,379
6½ " "	949	218			242			489				
7 " "	11,558	915	2,279	846	134	265	3,582	325		3,177		
8 " "	3,300						300					
Total 8 ft. ties	53,468	3,486	7,189	846	547	265	6,533	5,855	1,192	17,997	4,179	5,379
8 ft. 6 in. ties:												
6 in. thick	2,192		290	313			1,250	199	140			
6½ " "	2,333		50			112		2,191				
7 " "	18,808		6,032	1,537	391	2,657	5,085	3,106				
Total 8 ft. 6 in. ties	23,333		6,352	1,850	391	2,769	6,335	5,496	140			
9 ft. ties:												
6 in. thick	3,018		68		920			500	1,530			
7 " "	4,515				1,542		1,900	928	145			
Total 9 ft. ties	7,533		68		2,462		1,900	1,428	1,675			
10 ft. ties: 7×10	130						130					
Misc. N. G	307				110			161				36
Total U. S. reported, as above	84,771	3,486	13,609	2,696	3,510	3,034	14,898	12,940	3,007	17,997	4,179	5,415

PERCENTAGES

Deduced from the preceding table, showing the proportion of the mileage reported for the United States, and each section laid with cross-ties of each different length and thickness.

LENGTH AND THICKNESS.	Total U. S.	Northeast. New Eng.	Northeast. Middle.	South. Va., etc.	South. So. coast.	South. So. int'r.	South. So. west.	North Central. Ohio, Ind., Ill.	North Central. Mich.	North Central. N. W. of Chic.	Far West. Far W. int'r.	Far West. Pacific.
8 ft. ties.												
6 in. thick	48.3	66.1	36.1		5.0		18.6	39.5	39.6	82.4	100.0	100.0
6½ " "	1.1	6.7			7.1			3.9				
7 " "	13.7	27.2	16.7	31.4	4.0	8.7	24.3	2.5		17.6		
8 " "	0.4						2.0					
Total 8 ft ties	63.5	100.0	52.8	31.4	16.1	8.7	44.3	45.9	39.6	100.0	100.0	100.0
8 ft. 6 in. ties.												
6 in. thick	2.6		2.2	11.6			8.4	1.6	4.7			
6½ " "	2.7		0.2			3.7		17.1				
7 " "	22.3		44.3	57.0	11.5	87.6	34.4	24.3				
Total 8 ft. 6 in. ties	27.6		46.7	68.6	11.5	91.3	42.8	43.0	4.7			
9 ft. ties.												
6 in. thick	3.5		0.5		27.1			3.9	49.9			
7 " "	5.4				45.3		12.9	7.2	4.8			
Total 9 ft. ties	8.9		0.5		72.4		12.9	11.1	54.7			
Grand total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

ft. ties (about 5,500 miles out of 8,500), the remainder being all 8 ft., except about 500 miles of 9 ft ties. In Illinois, all ties reported are only 8 ft. long and 6 in. thick, except a considerable mileage of much larger ties (9 ft. long by 7 in. thick) on the Illinois Central. In Michigan, also, 8½ ft. are conspicuous by their absence, only 140 miles being reported as laid with them. Something over half the mileage of the state appears to be laid with long 9 ft. ties, the remainder with 8 ft.

In thickness, taking all four states together, there are

Of ties 6 in. thick ..... 54.6 per cent.
" " 6½ " " ..... 16.8 " "
" " 7 " " ..... 28.4 " "

Curiously enough, the use of the greater thickness i mainly confined to the shorter ties, there being, for example, only 145 miles of ties thicker than 6 in. reported from Michigan. This difference of practice is doubtless largely owing to the difference in the timber, which makes length a more costly feature, comparatively, in an oak tie than in a hemlock. The New York, Pennsylvania & Ohio, formerly of 6 ft. gauge, appears to be the only line using 9 ft. oak ties exclusively or in large quantities.

NORTHWEST OF CHICAGO.

Northwest of Chicago the size of ties becomes almost uniformly 6 in. by 8 in. face by 8 ft. long, only some 3,000 miles out of 18,000 being 7 in. thick and *none* over 8 ft. long. Less than one-half (48 per cent.) of the ties are reported to be of oak, the remainder being chiefly cedar (37 per cent.) or hemlock (11 per cent.), with a few hundred miles of miscellaneous woods. Only two roads in this section, the Kansas City, St. Joseph & Council Bluffs and the St. Joseph & Des Moines, report all ties of oak. The Chicago, Burlington & Quincy, Central Iowa and Burlington & Missouri River report 70 to 94 per cent. of oak, but few of the remaining lines so much as 50 per cent., and several less than 10 per cent.

On the roads in the Far West, Colorado, Dakota and Montana, oak and cedar both entirely disappear, almost half the mileage reported (4,179 miles) being laid with northern pine (a very poor tie) and the remainder with Colorado spruce or fir. The length is universally 8 ft. (for standard gauge) and the thickness 6 in., the face specified as a minimum being reduced to 6 or 7 in.

PACIFIC STATES.

In this region oak is almost entirely out of use, one note saying: "We consider red and yellow fir the best timber in Oregon for ties, both as regards its lasting qualities and its tenacity in holding spike. Oak and ash on this coast are not good for ties, being very porous, coarse-grained and short-lived. Some cedar ties are used on tangents, but the wood is very soft and does not hold a spike well." California red-wood is also used in immense quantities for ties, for which it is well suited. Our reports from the Pacific states, however, are exceptionally incomplete. So far as they go, they indicate that ties longer than 8 ft. are not used on that coast.

CANADA.

In Canada few oak ties appear to be used, the largest percentage on any line from which we have reports being 10 per cent. on the Grand Trunk, the remaining 90 per cent. being hemlock or tamarack, with cedar on sidings or for light traffic. Other roads report from 30 to 75 per cent. of cedar. All ties appear to be 8 ft. long by 6 in. thick, varying from 6 to 8 in. minimum face. One line expresses a preference for small tamarack ties (6 in. face), instead of cedar or hemlock, using the large number of 3,100 per mile, or less than 20½ in. centre to centre.

In the coast provinces of the Dominion the same dearth of oak seems to exist, none whatever being reported as in use on any line. The Eastern Extension Railway (Nova Scotia) and the Prince Edward Island Railway report half hemlock and half spruce, the International, 90 per cent. cedar and 10 per cent. juniper, and the New Brunswick Railway 75 per cent. cedar and the remainder hemlock or other soft woods. A few 9 ft. ties are used on the government lines, but in general ties are 8 ft. long.

ENGLAND.

Baltic red pine, with a few Scotch fir and other soft woods seem to be almost invariably used in England for "sleepers," as they are termed, to the exclusion of oak or other hard woods. Three out of the six companies from which we have reports creosote all their ties. The London & Northwestern Railway is using steel sleepers on an extensive scale, having already 20,000 in use, and contemplating laying a further quantity in the coming year. These ties were illustrated in the *Railroad Gazette* for April 13, 1883.

The standard dimensions for sleepers throughout England would seem to be 10 by 5 in. section by 9 ft. long, the Metropolitan District Railway alone reporting a heavier section, 12 by 6 in. English practice thus differs decidedly from American, first in having a standard at all, and secondly in the dimensions of the standard, which is quite different from anything in American practice, especially in the thickness used. English sleepers, as is well known, are placed much further apart than is usual here, usually about 3 ft. from centre to centre, and sometimes even more, and chairs are used on each tie to support the "bull head" non-reversible double-headed rail, which is by far the most generally used. All the lines from which we have reports use this rail.

GERMANY.

The following table gives a complete summary of the number of ties of each kind of wood in use on the railroads of the German Empire at the close of the fiscal year 1881-2. It will be seen from it that nearly two-thirds of the ties in use have been creosoted, or treated with chloride of zinc or other chemical:

Statistics of Cross-ties in Use on the Railroads of the German Empire, 1882.

Number. Kind of wood.	Impregnated.	Unimpregnated.	Total.
Oak	15,324,460	16,682,670	32,007,130
Pine	20,034,320	4,021,164	24,055,484
Other hard woods	350,699	278,440	629,139
Total	35,709,479	20,982,247	56,691,753
Per cent. of total.			
Oak	27.1	29.4	56.5
Pine	35.3	7.1	42.4
Other hard woods	0.6	0.5	1.1
Total	63.0	37.0	100.0

Miles of road, 21,279; of track, 36,251.
Average number of cross-ties per mile, 1,564.

The number of cross ties reported is equivalent to an average distance of a little more than 3 ft. 4 in. from centre to cen-

tre, which is even more than in England. A standard German work on railroads gives the ordinary distance as 1 metre (3 ft. 3⅜ in.) from centre to centre except that next the joint tie the distance is reduced to 800 millimetres—31½ in. The standard size is given as 160×250×2,500 mm. (about 6 1-3 in.×9¾ in.×8 ft. 3 in.), with joint ties 160×340×2,800 mm. (6⅓in.×13¼ in.×9 ft. 3 in.). The sizes in use vary, however. This is the only country in which iron sleepers have been much used. Their use is extending.

The average weight of rail used is much lighter than in England and not materially different from American practice. The section of rail used is also almost invariably a T-rail, like the American pattern, a small percentage only differing therefrom.

Contributions.

Locations on Paper and in the Field.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I cannot resist the temptation of answering "Olif's" letter, which appeared last week, as it is so very one-sided that it might mislead people who are apt to be influenced by such things.

Although my own experience in practice does not extend over even one-half of the time that "Olif's" does, still I presume that I may lay claim to a more varied one, as his, from his own utterance, has been very limited in extent, although long in time.

His denunciation of "office location" is not only severe but very sweeping. There is no question but that contour maps have their abuse as well as their use; and it is to find the point where use begins to become abuse that requires judgment. On a small branch road in a country which offers no serious location problems, or on the prairies, on roads such as they built there, elaborate topographical surveys are an unnecessary expense. But on surveys for a trunk line through a heavy broken country or a foot-hill region where long tangents may be evolved, topographical maps carefully made and office location become invaluable. That the gathering of material for making a useful topographical map does not require a good "natural locating eye" and matured judgment is a very general mistake. The value of a survey, as regards its cost, bears directly on the object for which it is made, in a money sense, as to amount which is proposed to be expended on the project. A contour map increases the cost of a survey and also its value—both of which can readily be reduced to dollars and cents. If the increase in value is greater proportionally than the increase in cost, it must be an advisable thing to do. The great trouble with obtaining contour maps is that good topogrraphers are few and far between, they being the scarcest article of good quality in the engineering market that I know of; from the fact, that the topographer must be naturally inclined in that bent, of good judgment and a rapid workman.

American railroad engineering practice has unfortunately been much restricted by the fact that railroads are generally built to profit by the construction at so much per mile, so that, when a road is built to make money out of its operation after completion, engineers who can successfully cope with this problem are hard to get.

Millions of dollars certainly have been thrown away, as "Olif" says; but in many cases if the managers had spent twice or thrice what they did for their surveys, where a million has been squandered nine hundred thousand might have been saved. J. M. B.

P. S.—I would respectfully refer "Olif" to W. F. Shunk's "Field Engineer," art. xxv., page 48.

PITTSBURGH, Pa., Dec. 22, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

"Olif," in an article published in your issue of Dec. 19, and entitled "Locating on Maps and in the Field," makes, to use a very mild expression, some very remarkable and peculiar statements, in which I am sure the majority of experienced engineers do not concur.

I am at a loss to understand what is meant by "locating in the field" [the title was the Editor's], but my conception of the phrase is that it is to directly locate the alignment (tangents and curves) of a railroad without the aid of any preliminary preparation by simply going on the ground, "setting up," and forging ahead, fitting such tangents and curves suited to each particular and peculiar portion of the line as the "practiced eye" of the "natural locator" might direct, and that too at the rate of from five to eight miles per day

"Olif" must certainly be a phenomenal engineer to be able to locate advantageously on the ground the line of a railroad through a difficult country without any artificial means other than that of his *practiced eye*, and at the rate given above, which I consider extraordinary progress.

Now if we are to *locate* direct, what is the use and value of a preliminary survey. I suppose "Olif" considers this as so much money thrown away.

I know of roads which have been located by this metho and afterwards built, but they generally proved to be abortions, and the alignments were forever an eyesore to all and a disgrace to the engineer "fathering" the same.

I do not know what merits are claimed for this plan, for it seems to be modeled after the "hit and miss" and "try, try again" method.

I cannot for the life of me understand how an engineer could intelligently, and, at the same time, economically and speedily, locate a long line on a maximum grade through a difficult country without a basis of some kind.

On most roads the ruling gradient to be used is generally known, or instructions given that a certain one is not to be exceeded, and this factor known, it is an easy matter first to run a careful preliminary line conforming to this knowledge. I state it positively, and the assertion will be corroborated by nine-tenths of all experienced engineers, that this preliminary line should always be run first, taking care to put it as nearly as possible where it should go; this survey to be accurately plotted according to a convenient scale (say $\frac{1}{2500}$) and contours shown for, say, every ten feet difference in vertical elevation; the contours to be taken in the field with a hand level working from the actual elevations of the centre line.

With this map in hand, we have a basis, as it were, to work from. On the same we can project with precision and exactness any number of lines with their varying tangents and curves, and can note to a nicety the effect of a change in any of them.

With prepared curves we can readily and speedily determine what kind of a curve is best suited to round a certain point or fit into a receding portion of the hill-side.

To obtain this knowledge on the ground, it would be necessary to judge by the practiced eye the curves best suited, and it is only after repeated trials that the right one is found. And even should the curve fit the ground, we may find, on examination of the profile that the line is either too high or too low, and all the work must be done over again.

But by first projecting a line on the map, for a short distance ahead at a time, and then calling off a profile by means of the contours, we can readily determine how the line may be improved, and thus revising the work as we go along, allowing for compensation, etc., we have thus fixed on our map the best possible line that can be had.

Any engineer who understands his profession, with proper notes can then run in this line on the ground, and if done in strict conformity with the notes furnished, the profile of the surveyed line will vary but slightly from the paper location. The line will rarely need any subsequent revisions and will thus stand once for all.

But contrast this method with that of locating in the field. Having run in certain lengths of line, how is the locating engineer to know whether his work is satisfactory or not? He has no way of judging except from the profile, which must be carried along in the field, and an inspection of this is the only tell-tale which will inform him how he is progressing. As stated before, and reiterated here, it will be the exception rather than the rule that he has struck it the first time. Or again, his profile may look very well, but his line may be an abomination, not apparent at the time; for, having no map, the engineer may not know what the alignment is like until after the grading is done and the track is laid, when any defects that do exist will be prominently brought to view.

In my opinion a paper location is first necessary to show the engineer what his line will look like when put on the ground, for the same reason that the architect first makes a plan of a proposed structure in order that he may observe what his building may look like and remedy its defects before the same is actually built. It cannot be denied that locating from maps bears about the same relation to locating on the ground as does the building of a house by a competent carpenter according to the plans of an architect to the raising of a log barn by some Western backwoodsmen.

I agree with "Olif" that it is a rare occurrence to find a fast, *cheap* and accurate locating engineer.

It is not often that *cheapness* and talent and genius go hand-in-hand together.

Regarding the statement that millions of dollars have been thrown away in this country by office locations, it would be much nearer the truth to say that the reverse is the case, as witness the many changes made in prominent railroads all over the land, which were originally located by the "field" method. FILO.

The Inter-state Commerce Bill.

The Inter-state Commerce bill, now engaging the attention of Congress, is occupying time which might more profitably be spent upon something else. Mr. Reagan's measure had its beginning at a time when the railroad problem was a very different thing from what it is now. Complaints of excessive charges and unjust discrimination were then frequent and, perhaps, well-founded. They were dealt with in an imperfect way by the states, and the resulting crop of Granger legislatures had sought to deal in a summary manner with the most complex problem of modern times, a problem whose factors are to be sought not merely within the boundaries of a single state, not merely within the boundaries of the United States, but in every country with which we have commercial relations. As we write these lines our attention is arrested by a statement that the ship-owners of Hamburg are perplexed by a regulation of the German government which proposes to tax petroleum barrels as cooperage. As Russian petroleum enters Germany in railway tanks, it will escape the duty, and thus the German ship-owner as well as the American oil-producer will be placed at a disadvantage in the market. One of the elements of the cost of petroleum in Hamburg is the charge of American railways for carrying it to the seaboard. Therefore, any legislation of ours which deals with railway transportation must take into account what is going on in Germany. Still more must it take account of what goes on in India, in Egypt, in Australia, and in every country that competes with us in the exportation of wheat or cotton.

The Granger legislation having yielded results only partly satisfactory, the subject was taken up by Congress with the object of applying the same principles to inter-state commerce that had been applied more or less rigidly to local traffic. The Reagan bill, which has dragged its slow length through so many sessions, is the product of this endeavor. But meanwhile the railway problem has undergone a change. Competition has accomplished most of the ends which Grangerism aimed to secure. It has reduced the rates of transportation for persons and property far below the dreams of the Grangers themselves. This result has not been confined to the so-called trunk lines. It has extended to the Missouri River, to Colorado, Utah, Montana, and the whole Pacific Coast, to the South and Southwest, to New England and New York. It is working night and day in countless directions ceaselessly and irresistibly. It has brought railway kings to their knees and made railway stockholders objects of commiseration as they were once objects of envy or of hate.

Now, any comprehensive or intelligent treatment of the railway problem ought to embrace the question of railroad construction as well as of railroads already constructed. If the law of competition is to be left in full force (and there is nothing of which railway men stand in so much terror), it is both unjust and inexpedient to put shackles upon the forces which are competing with each other. It has been proved that competition is more effectual than statute law to reduce rates. If we divide the whole people into two classes—railway owners and railway customers—and conceive that the interest of the latter is to get the lowest possible scale of charges, competition will surely give it to them. It will not stop at the point of giving the lowest rate consistent with a fair dividend on capital invested, which is the *ultima Thule* of Granger legislation. It has gone further in many instances. It has required railroads to be run for operating expenses only; it has reduced operating expenses to a minimum and even below the point of safety. So far as the Reagan bill has this end in view, it will be as superfluous as an attempt to supplement the ocean tides with a squirt gun.

But it is said that unjust discriminations must be attended to. Very well. What is a discrimination? and what is an unjust discrimination? These are questions to be determined by the weight of evidence They cannot be determined by an act of Congress. Would it be an unjust discrimination to carry petroleum to the seaboard for shipment to Germany at a less rate than is charged for petroleum to be consumed in New York? Would it be wrong to carry wheat on through bills of lading from Chicago to Liverpool at less than the proportionate rate from Chicago to Boston? If yea, the farmers of Iowa and Dakota will feel the consequences more heavily than the railroads. Examples might be multiplied, without extending our range of vision across the water, to show that any procrustean rule on the subject of discriminations will cause more injustice than it will cure. What is wanted to deal with grievances of that class is a commission or board like that of Great Britain, clothed with such powers as experience has shown to be necessary. The power of public opinion would be sufficient to rectify nearly all the abuses complained of.

Considering the complexity of the railway problem, the gigantic interests involved, the tendency of special interests to get the better of general interests in all matters of law making and law administering, and considering especially the character of our institutions, our business habits, and mental hereditaments, we think that any arbitrary interference with the law of competition or any attempt to force it prematurely into channels which it has not yet invaded would be a grave mistake. But if such interference must be had, it should not stop with the regulation of existing railways. It should provide some tribunal to determine what new competition is admissible—that is, what new railways may be built. Justice requires no less. If the Legislature takes railway property out of the hands of the owners in whole or in part, thus interrupting the play of natural forces, it makes itself responsible, to some extent, for the earning power of the roads, and ought, therefore, to exercise discretion in allowing new roads to be built to the injury of old ones. In most of the states the building of new railways is strictly a matter of private judgment. The right of eminent domain practically belongs to any group of adventurers who can furnish or borrow the money to survey a new line. That this right has been much abused is certain. It has generally happened that those who have abused it have received sufficient punishment in the loss of their investments. It may be safe to trust to the deterring force of recent examples to prevent the paralleling of old lines, but it is worth asking whether in the older states, at least, the power to determine the needs of the community for railway extension, involving as it does the rights of all land owners, should not be reserved by the Legislature itself instead of being left to the caprice of individuals. At all events the government should either let competition work out its results without hindrance, or put definite limitations upon it.—*New York Evening Post, Dec.* 22.

Appliances for the Safety of Trainmen.

The last monthly meeting of the Western Railway Club, held Dec. 17, President Verbryck in the chair, was devoted to the discussion of this subject, after some preliminary business had been transacted, and four new members were admitted.

Mr. W. R. DAVENPORT opened the discussion. Yesterday the president of one of the great lines said to him, "How can our farmers live with corn at 15 cts. a bushel?" But the man at the other end wants to know why, if there is such an enormous corn crop, corn is 60 cts. a bushel. The transporters have the most difficult problem to solve—how to move the freight from one to the other at a sufficiently low price. That which will promote the safety of men is bound to aid in solving this question, as the rolling stock is the branch of the problem which needs most seriously to be attacked. A great reduction in cost of transportation had taken place in the past few years, but a great, and perhaps greater one still remains to be made. As the manager of a great system of lines said to me the other day: "I am persuaded that we must reduce the cost of the movement of freight over our lines to 1½ mills per ton per mile." I looked at him in astonishment, but he continued: "We have reduced the cost to 2½ mills per ton per mile, and we must get it down to 1½. Every reduction that has been made has left us lower than we were before. Our salvation depends upon reducing the cost of moving freight and passengers to these minimums, as they now look to be, in order to enable us to make earnings to pay dividends." This is a startling proposition, but I am not certain it is not feasible. The transportation business will be for twenty years to come the most difficult problem before the country. In England, we are told that the average distance their coal and iron are moved to the point of consumption is nine miles; while in this country it is 128 miles. Therefore, this country, more than any other, must reduce its cost of transportation, and if but one-sixth of our products go abroad, five-sixths being consumed here, we ourselves reap the benefit of our own ability.

Mr. JOHN KIRBY then addressed the meeting, expressing his regret that railroad companies were so backward in introducing the standard appliances for the safety of trainmen (illustrated in the *Railroad Gazette* for Nov. 21, 1884), which had been adopted so long ago as 1879. He was not aware that any road except the Lake Shore & Michigan Southern was following the recommendations of that report. He was glad to see that one of the leading lines between Chicago and New York had settled down upon an automatic coupler, but feared general agreement was still far off. Mr. Kirby then explained in detail the nature of the standard attachments referred to above.

A general discussion as to whether ladders should be at the side or end of a car followed, participated in by Messrs.

Forsyth, McKenzie, Snow and Miller, all of whom favored ladders at the side, and Mr. Kirby, who stated that while chairman of the committee on the subject he had made many inquiries about side ladders, and yardmen and trainmen were unanimously in favor of the side ladders, but railroad managers thought it was not expedient to recommend them, believing that while the men themselves would recommend it as being most convenient, it was not the best thing for them. Going past a bridge or post they are liable to be knocked off, but if between the cars they are safe.

Mr. Snow stated that they had had several cases where trouble had arisen from sill steps giving way, and finally he had put on one man whose business it was to see that the ladders and the top of the brake wheel were kept in a safe condition. Every car that goes out of the shops and comes into the yards is tested, by running a stake under the car as if to pry off the steps and if found weak they are taken off and new bolts put in.

Mr. L. E. JOHNSON, of Aurora, said: "There have been injured on the Chicago district from Jan. 1, 1882, to June 1, 1884, 46 train-men in the following manner:

By draw-bars of unequal height	3
Hands caught square between draw-bars	25
(Six of these caused by gloves or mittens catching.)	
Stubbed their feet and fell, pulling pins	2
Draw-bars shoving by each other	2
Caught between dead-blocks	4
Caught between dead-blocks and head of pin	2
Caught in draw-bar while pulling pins	2
Ladder rounds giving way	1
Caught in frogs	5
Draw-bars shoving under the car	1

Mr. WEST, Master Mechanic, at Burlington said that most of the trainmen injured on the Chicago, Burlington & Quincy Railroad were hurt by foreign cars having dead-blocks on them which caught the arms in reaching over or under them trying too couple. They had men hurt, with their draw-bars, by having mittens frozen to links so they could not get their hands off. Most of the men were hurt through their own carelessness, trying to couple when cars were coming together too fast or too slow and holding the link too long. Sometimes they lay their hands on the bracket on the drawbar that serves as a buffer, and when it comes back against the deadwood mashed their fingers. He did not think they could improve them.

Mr. FORSYTH thought that drawbars and buffer blocks were a frequent source of danger. On their road they had the Potter draw-bar arranged with a bracket which strikes against a central buffer-block about 8 in. square and 24 in. long. The double dead-blocks, which were such frequent causes of accident, were dispensed with altogether. Single and double dead-blocks were used, he thought, in about equal numbers.

A discussion on the use of sticks for coupling cars followed, in which it seemed to be generally admitted that it was difficult to get trainmen to use them, and that the adoption of some automatic coupler was the most hopeful remedy for the danger now existing.

Mr. TOWNSEND then described the workings of the Hine coupler, a device somewhat similar in its main features to the Janney. President Verbryck stated that they were putting in a few of the Hine couplers as an experiment.

The discussion on the use of single or double dead-blocks was then renewed, but the renewed discussion was largely based upon a misapprehension, it having been stated that the Master Car-Builders standard for dead-blocks was 30 in. from centre to centre, whereas it is from out to out. Mr. John Kirby corrected the error.

The best material for piston-rods, rocker-arms, cross-heads, driving-boxes, and piston-packing was then selected as the next subject for discussion, and the meeting adjourned.

TECHNICAL.

Locomotive Building.

The Rogers Locomotive Works in Paterson, N. J., have completed a locomotive which is to be sent to the New Orleans Exhibition before going into service.

The Western & Atlantic shops in Atlanta, Ga., have completed a new passenger locomotive for the road. It has 17 by 24 in. cylinders and 68 in. driving wheels.

The Pittsburgh Locomotive Works, in Allegheny, completed their exhibit for the New Orleans Exposition on Dec. 16. The exhibit will comprise three locomotives, one a saddle tank switch engine, weighing 56,000 lbs.; another a passenger engine for the Jacksonville, Tampa & Key West road, weighing 72,000 lbs., and the third a heavy passenger engine, weighing 92,000 lbs.—*Pittsburgh American Manufacturer.*

The Rhode Island Locomotive Works in Providence have a number of orders on hand, enough to keep the shops at work for several months.

Car Notes.

The St. Charles Car Works in St. Charles, Mo., are building 100 freight cars for the Kansas City, Fort Scott & Gulf road.

The Detroit Refrigerator Car Co. has been organized in Detroit, Mich., with $60,000 capital stock.

The Wason Manufacturing Co., in Brightwood (Springfield), Mass., has lately received orders for drawing-room cars for the Boston & Lowell and the Old Colony roads, and for passenger cars for the Jacksonville, Tampa & Key West, the San Francisco & North Pacific and the Panama railroads. The orders now on hand are enough to keep the shops busy until July next.

The North Carolina Car Co. in Raleigh, N. C., has turned out 69 flat cars for the Raleigh & Gaston road. A new boiler house of brick is being added to the shops, and a new engine of 100 h. p. put in.

The Pullman car shops at Pullman, Ill., have a contract to build a number of sleeping and parlor cars for the Wagner Co. The freight shops are building 250 box cars for the Chicago, Burlington & Quincy road.

Bridge Notes.

The Keystone Bridge Co. in Pittsburgh is busy, with a full force employed, but a reduction of from 5 to 10 per cent. in wages has been made, to date from Jan. 1 next.

The bridge works of Shultz & Co., in Pittsburgh, have orders enough to keep them at work all winter, with a slightly reduced force.

Iron Notes.

The Everett Iron Co. has put its new furnace at Everett, Bedford County, Pa., into blast. It is a coke furnace 18 by 75 ft. in size, and is supplied with all the latest appliances.

Citico Furnace, which was compelled to blow out several months since on account of defective boilers, will go into blast Jan. 1. President Chamberlain, of the furnace company, recently visited the North for the purpose of investigating the iron outlook. He was well pleased, and thinks there may possibly be an advance.—*Chattanooga (Tenn.) Tradesman.*

The furnace and other property of the Saucon Iron Co., at Hellertown, Pa., were sold at sheriff's sale recently, and bought by the Thomas Iron Co., at a nominal price, subject to the mortgages.

The two new furnaces of the Dayton Iron & Coal Co., in Chattanooga, Tenn., are nearing completion.

Oley Furnace in Berks County, Pa., owned by the Clymer Iron Co., has gone out of blast until spring.

Manufacturing and Business Notes.

Among the recent shipments of Dean Brothers' Pump Works, Indianapolis, Ind., were two large steam pumps having 20-in. steam cylinders, 14-in. water cylinders and 24-in. stroke. One went to Muscatine, Ia., and the other to Cloquet, Minn. Each pump can deliver 1,600 gallons per minute

At the recent fair of the Massachusetts Charitable Mechanics' Association in Boston, one of the four gold medals given was awarded to the Seibert Cylinder Oil Cup Co. for the locomotive and other lubricators which it manufactures.

The gold medal for superior excellence in hoisting engines, boilers and small stationary engines, at the exhibition of the Massachusetts Charitable Mechanics' Association, held at Boston, was awarded to the Lidgerwood Manufacturing Co., of New York.

The Vulcan Iron Works, of Chicago, are finishing for the Atchison, Topeka & Santa Fe Railroad another pile driver with automatic steam hammers, making the eighth of this pattern furnished that company.

Messrs. Watson & Stillman, of New York, were awarded a medal of superiority for their improvements in hydraulic jacks, at the American Institute Fair in New York.

British Rail Exports.

For November and the eleven months then ending these have been, to the United States and to all countries, in tons of 2,240 lbs.:

	November.			Eleven months.		
To United States:	1882.	1883.	1884.	1882.	1883.	1884.
Iron rails	....	....	....	21,127	2,593	7
Steel rails	4,636	6,702	1,007	167,142	63,579	17,476
Total	4,636	6,702	1,007	188,269	66,162	17,483
To all countries:						
Iron rails	2,014	1,913	1,305	44,722	23,913	13,836
Steel rails	52,292	57,488	33,216	687,416	695,905	493,398
Total	64,306	59,401	34,521	732,138	719,818	507,234

The exports to this country were insignificant, as they have been throughout the year. To other countries they were 36 per cent. less than last year and 43 per cent. less than in 1882 in November, and for the eleven months they were 489,751 tons this year, against 653,656 tons last year, 543,869 in 1882, and 391,383 in 1881. Of the entire decrease since 1882 170,786 tons is in exports to this country, and 54,118 in the exports to other countries. The exports to other countries were much larger this year than in 1881.

Car Couplers.

The New York Central & Hudson River Co. has adopted the Ames coupler, and will apply it to its freight equipment. The Lake Shore & Michigan Southern, the New York, Chicago & St. Louis, the Michigan Central and the Boston and Albany companies have also bought the right to use the same coupler.

The United States automatic car coupler, recently approved by the Massachusetts Railroad Commissioners, has been adopted by the Boston & Lowell for its entire system. It is already in extensive use by the Concord Railroad.

Bas Relief Railroad Map

There will be on exhibition at the New Orleans Exposition, as a part of the exhibit of the Savannah, Florida & Western Railway, a bas relief map of the Plant system of railroads, 28 ft. long and 16 ft. wide, the work of Mr. T. C. Leutze. It consists of 12 sections, each representing the topography of certain portions of Florida, Southern and Eastern Georgia and South Carolina. It is accurate in the representation of distances and elevations, being modeled upon a horizontal scale of two miles to an inch, and upon a vertical scale of 50 ft. to an inch. The model is composed of a layer of Portland cement spread upon a large table as a foundation for a superstructure of plaster of paris. The ground work is painted green, with watercourses, lakes, etc., in blue, towns and cities in red, railroads in gold, silver and red, and county boundaries in yellow and red.

St. Louis Engineers' Club.

At the annual meeting in St. Louis, Dec. 3, Mr. J. B. Johnson, the Secretary, presented his annual report, in which he says: "There have been 17 meetings of the Club, at 13 of which regularly announced papers were read. The average attendance at these meetings have been 23 members. Eighteen papers have been presented, all but one of which have been or are to be published in the *Associated Journal.*

"The following members have contributed papers: Messrs. H. C. Moore, Gayler, Sobolewski, Woodward, McMath, Robert Moore, O. Chanute (not a member), Humphreys, Miller, J. W. Hill, Adams, Johnson, Constable and Nipher.

"There have been 49 new members received into the Club and 6 names dropped from the rolls. The total membership is now 106. * * *

"The Club has been the recipient of various publications and donations. It regularly receives the proceedings of the American Society of Civil Engineers, and those of the Philadelphia and Pittsburg clubs. The most notable donations in the past year have been the complete proceedings of the American Society of Civil Engineers, which have been bound in 12 volumes, and the report of the New Boston Water Supply from Sudbury River.

"A new constitution has been adopted, more in accordance with the present need of the Club than that which has served for the past 16 years.

"The Club is now in excellent working condition, and there seems no reason why it should not so continue. The success of the past year is due to a generally awakened interest in the matter, which can be largely traced to the work of the Committee on Programme, who provided for so valuable a series of papers for the meetings. It is perhaps not too much to say that no local engineers' organization in this country has done better work in the past year than our little Club. * * *

"As to the character of our meetings, many members have expressed a desire that they might be somewhat more informal and sociable. I believe this end could be attained by leaving a portion of each meeting to the presentation of various matters of interest which may arise in the several special fields of practice in which members are engaged, thus furnishing an opportunity for some informal discussion, queries, suggestions, etc. There is no practical engineer who does not meet with many such items in the course of a year which could profitably be presented to the Club. If time for this can not be found in any other way, it may be found advisable to limit the time for the reading of the papers, and if the article is long, let only portions or an abstract be given, inasmuch as the article will come to all members in printed form, when they can peruse it at pleasure. At least some scheme should be adopted by which members who attend regularly may obtain at least a speaking acquaintance with each other in the course of a year."

The Commiteee on Programme submitted the following list of papers to be presented:

Dec. 17, Earlier Floods in the Mississippi, J. A. Ockerson.

Jan. 7, Economy in Gas Engines, J. Sobolewski; Protection against Fire and Means of Extinguishing the Same, C. T. Aubin.

Jan. 21, Use of Compressed Air, C. Shaler Smith; An Improved Crane, Frederick Schickle.

Feb. 4, Elimination of Errors in Field Work, Wm. Bouton; Mill Creek Sewer, Wm. Wise.

Feb. 18, Street Pavements, Thomas H. Macklind; Improvement in Switches, Hubert Taussig.

March 4, Experiments in Hydraulics, Henry Flad; Treatment of Wood for Street Pavements, T. D. Miller and T. J. Caldwell.

March 18, Pile Driving and Related Work, C. V. Mersereau; Use of Diagrams of Crank Effort in Designing, W. H. Alderdice.

April 1, Amsler Integrators, M. L. Holman; Construction in Wood and Iron, K. Tully.

April 15, Steamboat Shafts, H. W. Baker; the Efficiency of a pair of Holtz Engines, one acting as generator the other as motor, F. E. Nipher.

April 29, Utilization of Fuel by the Generative System, Wm. B. Potter; Dynamometers, Charles F. White.

May 13, paper by Frank H. Pond, subject not given; Theory of Car Starters, J. B. Johnson.

May 27, Theory of Ammonia Refrigerating Process, C. M. Woodward; Report of Committee on Smoke Prevention.

After this report had been received nominations for officers were made, to be voted on by letter-ballot.

It was resolved that it is the sentiment of the Club that it is desirable to limit the reading time of any paper to about 30 minutes. The object of this resolution is not to limit the length of papers, which will be printed in full in the *Journal*, but if necessary to present only an abstract of the paper, or such portion as can profitably be pre-ented orally, and so obtain more time for the discussion and for the introduction of other subjects.

Mr. Robert Moore then read a paper on Sewerage and House Drainage in St. Louis, after which Mr. Whitman gave an account of the successful lowering of a 36 in. water-main by about 7 ft. without cutting off the supply or diminishing the pressure. The lowering was made necessary by a change of street grade. The meeting then adjourned

The Canada Locomotive Works.

From a letter to *The Engineer* by the late Walter A. Brown, written last summer, we take the following:

The Canada Locomotive Works, Kingston, are practically the only independent locomotive works in the Dominion, and are capable of turning out a considerable number of engines a year, and of employing 500 to 600 men. They have followed the example of several of the leading works in the United States, and have nearly suspended operations. The erecting shop is connected directly with the former, while the coal, etc., is stored on wharves, having 30 ft. of tideless water. The coal comes entirely from the United States, that of Nova Scotia, spite of the absence of duty, being unable to compete with it. The iron, on the other hand, comes entirely from Scotland, the produce of American works, in consequence of their protective duties, being higher by some cents per pound. The numerous modern tools are, with few exceptions, of Canadian build, chiefly from McKenzie & Bertram's works at Dundas, near Hamilton. These tools, whose surfaces are either left bright or lined out in gay colors, conform closely to English types. A simple and ingenious emery polisher, for coupling-rods, etc., hanging from a shaft and driven by ropes, is a decided novelty. In the yard was a specimen of a recent Canadian invention, namely, a "rotary steam snow-shovel," in which a kind of many-sailed windmill, made to turn about a horizontal axis, shaves off the snow with its front edges, sweeps it inside, and finally delivers it through an opening at the top with force sufficient to throw it to a considerable distance.*

The Electric Light for Cars.

The car on the Dedham Branch of the Providence road, which is lighted by electricity, is a favorite with passengers. The light is more brilliant than that of oil and is perfectly steady and safe and cleanly. The system used is known as the Trouve, and is a bi-chromate battery of peculiar construction. It consists of a wooden trough in which are fitted from four to six ebonite cells, each containing one zinc and two carbon elements. The elements are connected by means of movable clamps, and are attached to a windlass by which they are raised from or lowered into the exciting solution, as required to regulate the intensity of the current. A wooden stop, which may be pushed aside when necessary, prevents the elements from being entirely raised from the cell, while the height of the crank allows of the cells being removed for emptying and refilling. A spindle covered with india rubber supports the elements, the zincs being notched at the top to facilitate their fixation or removal, thus enabling them to be reamalgamated and rapidly rearranged. The car using incandescent lights produced by the Trouve battery makes several trips to and from Dedham every evening. This system is controlled by the Domestic Electric Light & Power Co., of this city, and it is claimed by them that they can light cars and residences at an expense not greater than that of gas at $2 per 1,000 ft.—*Boston Advertiser.*

A Peculiar Smoke-Box Equipment.

R. W. Bushnell, Master Mechanic of the Burlington, Cedar Rapids & Northern Railway, is using a peculiar spark-arrester in connection with the extended front end. He has an exhaust pipe ending in a single nozzle, that extends up about the middle of the flue-sheet. From the top of the nozzle to the base of the stack a pipe similar to a petticoat pipe without the flare extends, and this pipe is perforated with small oblong holes, about half the sheet being cut out with these holes. The netting is fastened in the ordinary position for extended front ends, but no diaphragm plate is used or is found necessary, as the perforated pipe acts as a draft regulator. Indicator diagrams taken from a locomotive thus equipped are remarkable for the absence of back pressure.—*American Machinist.*

The Franklin Institute.

At the stated meeting in Philadelphia, Dec. 17, Mr. W. Barnet Le Van presented a series of diagrams exhibiting the time-tables of the fastest railroad trains of Europe and America, and made the same the subject of some interesting comments on "Modern Railway Facilities."

The Secretary, Dr. Wahl, in his monthly report, referred to the lamentable inadequacy of the facilities and equipment of the United States Patent Office, and suggested that some action be taken by the Institute in bringing the needs of the office to the attention of Congress, which had hitherto neglected to act upon the request and recommendations of successive commissioners. It was shown that the average annual surplus of the Patent Office for the five years ended Dec. 31, 1883, had been $285,992, all of which is contributed by the inventors in the form of fees. Under these circumstances they have surely the right to ask that their business shall be dispatched, efficiently and promptly.

The Secretary alluded to the experiments that were being conducted under the direction of Chief Engineer Ludlow, of the Water Department of Philadelphia, with the object of

*For full description and illustration, see *Railroad Gazette* Sept. 19, 1884.

purifying the water supply by a system of artificial aëration.

The Secretary spoke of the several projects for canals and railroads across the American Isthmus, and illustrated his remarks with the aid of a photographic map of the Isthmus, of which an image was projected on a screen with the lantern. He exhibited an Edison glow lamp, in which the copper, with which the juncture of the wires with the carbon filament is electroplated, had been volatilized by the heat of the lamp. The metal had been deposited very uniformly on the interior surface of the globe, forming a continuous copper coating of superb metallic lustre when viewed by reflected light, but so excessively thin as to be quite transparent by transmitted light, the transmitted color being green, or the complementary color to the first named. Similar effects have often been observed with the Edison glow lamp, but the specimen shown was remarkable for its extreme beauty.

Prof. Houston offered a preamble, setting forth that scientific books published abroad are absolutely essential to students and investigators, and are but rarely duplicated in this country, and a resolution that the Franklin Institute send a request to the representatives of Pennsylvania in Congress to use their utmost endeavors to place private parties who may import such books for their own use and not for sale upon the same footing as colleges and other incorporated institutions. The resolution was adopted.

The project of holding an exhibition on some special subject evoked considerable discussion.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston & Albany, annual meeting, at the Meionaon in Boston, at 11 a. m., Feb. 11, 1885.

Boston & Lowell, annual meeting, at the passsenger station in Boston at 10:30 a. m., on Jan. 17, 1882.

Connecticut River, annual meeting, at the office in Springfield, Mass., Jan. 21, at noon.

Philadelphia & Reading, annual meeting, at the office in Philadelphia, Jan. 12, 1885. The registry of stock closed Oct. 12.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Rock Island & Pacific, 1¾ per cent., quarterly, payable Feb. 2. Transfer books close Feb. 29.

Chicago, St. Paul, Minneapolis & Omaha, 1¼ per cent., quarterly, on the preferred stock, payable Jan. 20. Transfer books close Dec. 31.

Fitchburg, 2½ per cent., semi-annual, payable Jan. 1, to stockholders of record on Dec. 15.

Flint & Pere Marquette, 3½ per cent., semi-annual, on the preferred stock, payable Jan. 15, to stockholders of record on Dec. 24.

Holyoke & Westfield (leased to New Haven and Northampton), 4 per cent for the year ending Sept. 30 last.

Vermont Valley, 3 per cent., semi-annual, payable Jan. 1, to stockholders of record on Dec. 20.

Worcester, Nashua & Rochester, 1½ per cent., semi-annual, payable Jan. 1, to stockholders of record on Dec. 25.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car-Builders' Club* will hold regular meetings at its rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month. The next regular meeting will be on Thursday, Jan. 15.

The *New England Railroad Club* will hold its regular meetings at its rooms in the Boston & Albany station in Boston, on the evening of the third Wednesday in each month. The next meeting will be held Wednesday, Jan. 14.

The *Western Railway Club* will hold regular meetings at its rooms, No. 103 Adams street, Chicago, on the third Wednesday in each month.

Foreclosure Sales.

The *Rio Grande & Pecos* road was sold under foreclosure Dec. 17, and bought for $100,000 by Charles B. Wright, for account of the bondholders. The road extends from Laredo, Tex., to Santa Tomas, 27 miles, and has never been profitable.

Baltimore & Ohio Employes' Relief Association.

This Association has issued a circular containing full instructions for the examination of employés for vision, color-blindness and hearing, for which we regret that we cannot now find space.

A circular has also been issued from which we take the following:

"Certain officers of the Baltimore & Ohio Railroad Co. and of its Employés' Relief Association have undertaken the establishment of a Free Circulating Library for the employés of the company. They do this in the belief that such an institution will not only be welcomed by all classes as a popular and desirable addition to the Relief Association, but that, through its agency and development, much needed opportunity will be afforded employés to qualify themselves for promotion and advancement in life, while at the same time their children, wherever located, will have at hand facilities for study and instructive reading matter, seldom obtainable outside large cities. This will be done without cost to employés and in such manner that the books furnished can be utilized, not only at reading rooms (not always convenient of access), but also amid the comforts and society of their homes.

"The plan, in brief, is, by means of contributions of money and books to establish as a part of the Relief Association a compact library, selected with special reference to the wants and tastes of employés and their families; to print inexpensive, but carefully-prepared catalogues and cards on which to make requisitions for books, and to so distribute them that every member can receive and return literature without delay through the company's train service.

"One prominent feature of the library will be the appointment, at divisional and principal stations, of library committees, composed of those in sympathy with the movement, through whom the association can collect donations of money and books, and who will serve the purposes of local libraries in dealing with members."

The library is intended for the benefit of employés of the company and their families and contributions in books or money are asked for from all friends of the movement.

ELECTIONS AND APPOINTMENTS.

Chicago, St. Paul, Minneapolis & Omaha.—Mr. J. T. Clark, Assistant General Freight Agent, has been appointed General Freight Agent, to succeed Mr. J. H. Hiland, resigned.

Chicago, Union Central & Atlantic.—The directors of this new company are W. B. Hammond, Samuel P. Hazzard, Benjamin F. Rush, A. Dale Owen, P. W. Bartholomew, W. W. Murphy, and John W. Dodd.

Chicago & West Michigan.—The following circular from Vice-President and General Manager J. B. Mulliken is dated Muskegon, Mich., Dec. 18:

"The following changes are ordered, to take effect Dec. 22: Jason H. Carpenter is appointed General Freight and Passenger Agent vice J. H. Palmer, resigned, and William A. Gavett, Assistant General Freight and Passenger Agent, vice J. H. Carpenter, promoted. Offices as heretofore at Grand Rapids, Mich."

Denver, New Orleans & Missouri Pacific.—The directors of this new company are: John Evans, Cyrus W. Fisher, David H. Moffatt, William Bard, S. H. Elder, J. S. Brown, George Fritch, Charles B. Kountze, Denver, Col.; Jay Gould, Russell Sage, New York.

Kansas City, Fort Scott & Gulf.—Mr. James Long has been appointed Master Mechanic in charge of the new shops at Springfield, Mo. He was formerly on the Hannibal & St. Joseph road.

Mr. Charles Jones is appointed Southern Passenger Agent for this line, vice Mr. Chas. N. Winner, resigned. Communications should be addressed to him at No. 31 Madison street, Memphis, Tenn.

Michigan Central.—General Freight Agent A. Mackay has issued the following circular: "The Assistant General Freight agents, General Eastern Freight Agent and Commercial Agent of this company will have supervision, under instructions from the General Freight Agent, of the territory assigned below: A. W. Street, Assistant General Freight Agent, Chicago, in charge Michigan City and west to Chicago and Joliet, inclusive. C. J. Hupp, Assistant General Freight Agent, Detroit, in charge of all lines in the state of Michigan, including Detroit, Toledo and the Toledo and South Bend divisions. John Crampton, General Eastern Freight Agent, Buffalo, in charge of all lines in Canada, including Buffalo, Black Rock, and Suspension Bridge and the Michigan Midland & Canada Division (St. Clair to Ridgeway, inclusive). O. Waters, Commercial Agent, Bay City, acting under instructions from the Assistant General Freight Agent at Detroit, will have charge of all traffic originating at points on the Mackinaw Division, the Saginaw Division north of and including St. Charles and the Bay City Division north of and including Caro Junction."

Mobile & Ohio.—Col. T. M. R. Talcott has been appointed Vice-President and General Manager in place of Gabriel Jordan, deceased. Col. Talcott was at one time in charge of construction on the Chesapeake & Ohio, and was afterwards for 15 years on the Richmond & Danville road, serving successively as Chief Engineer, General Superintendent and General Manager; he left the Richmond & Danville some months ago. Col. Talcott has a very high reputation as an engineer and railroad manager.

Nevada Central.—Mr. Joseph K. Choate is appointed Acting Superintendent, with office at Battle Mountain, Nev., in place of N. W. Dunn, resigned.

Norfolk & Virginia Beach.—Messrs. C. G. Elliott and R. B. Cooke have been appointed Receivers of this company.

Pennsylvania Company.—The following circular from the office of Third Vice-President and Comptroller Thomas D. Messler, is dated Pittsburgh, Dec. 20:

"For the purpose of consolidating the auxiliary branches of the Accounting Department of the Pennsylvania Company, now located at Cleveland, O., and Louisville, Ky., with the main office at Pittsburgh, Pa., a reorganization of such department, with the following appointments under such reorganization, have been made, to take effect Jan. 1, 1885, viz:

"Albert McElevey, Auditor of Freight Receipts, Pittsburgh, Pa., who will have charge of all communications, duplicate way-bills, reports and settlement of balances relating to the freight accounts.

"James P. Farley, Auditor of Passenger Receipts, Pittsburgh, Pa., who will have charge of all communications, canceled tickets and passes, reports and settlement of balances relating to the passenger accounts.

"James Instan, Auditor of Disbursements, Pittsburgh, Pa., who will have charge of all communications, check-rolls, bills and reports, including engine and car mileage, relating to the disbursement accounts.

"The above named officers will be charged with the business, relating to their respective offices, belonging to the Pennsylvania Company, the Pittsburgh, Cincinnati & St. Louis Railway Co. and the Chicago, St. Louis & Pittsburgh Railroad Co. The reorganization referred to having abolished the offices of Auditor of Cleveland & Pittsburgh Railroad Co., Cleveland, O., and Jeffersonville, Madison & Indianapolis Railroad, Louisville, Ky., all communications and reports pertaining to the business of those roads and heretofore sent to those offices, will on and after Jan. 1, 1885, be forwarded to the proper Auditor at Pittsburgh, Pa., indicated above."

The following circular has been issued by Mr. John E. Davidson, Treasurer of the company:

"On Jan. 1, 1885, the auxiliary branches of the Treasury Department of this company, known as the office of Cashier of the Cleveland & Pittsburgh Railroad, at Cleveland, Ohio, and the office of Cashier of the Jeffersonville, Madison & Indianapolis Railroad, at Louisville, Ky., will be abolished, and the business heretofore transacted by these officers will be conducted by and through the Treasurer at the main office, at Pittsburgh, Pa. All communications relating thereto should be addressed accordingly. Drafts for balances due by this company on account of the above named roads should, after Jan. 1, be made on John P. Henderson, Assistant Treasurer, Pittsburgh, Pa. Remittances for amounts due this company, heretofore made to the cashiers above named, should be made to John E. Davidson, Treasurer, Pittsburgh."

Pine Bluff, Monroe & New Orleans.—The office of this new company is in Pine Bluff, Ark.; the directors are M. L. Bell, T. F. Brooks, C. M. Neal, C. M. Neal, Jr., and R. M. Neal.

Richmond & Allegheny.—At the recent annual meeting in Richmond, Va., the old board was re-elected, as follows: Wm. H. Barnum, Calvin S. Brice, Myron P. Branch, James T. Closson, Francis O. French, John Humphreville, John J. McCook, Wm. L. Scott, Samuel Shelburn, John W. Simpson, Allen Y. Stokes, Samuel Thomas, Charles E. Wortham.

Savannah, Florida & Western.—Mr. Marin Knowles has been appointed Southwestern Passenger Agent, with office in New Orleans, and Mr. Wm. Hughes Northwestern Passenger Agent, with office in Chicago.

Somerset.—At the annual meeting in Waterville, Me., Dec. 11, the following directors were elected: Reuben B. Dunn, John Ayer, Edward Rowe, S. S. Thompson, Frank W. Hill, R. Wesley Dunn, Wm. H. Brown, Nathan Weston, C. A. Harrington. Officers were chosen as follows: President, John Ayer; Clerk, Edward Rowe; Treasurer, Abner R. Small; Superintendent, W. M. Ayer,

Tioga.—At a meeting of the board of directors of this company held on Dec. 16, John King was elected President in place of H. J. Jewett, resigned; L. H. Shattuck was elected Superintendent in place of R. Du Puy, John J. McCullough was elected a director in place of H. J. Jewett, and Wm. Libbey a director in place of S. T. Arnot. J. C. Guthrie resigned as Vice-President, and that office was left vacant. C. C. Drake will remain with the company as General Agent.

Virginia Midland.—At the annual meeting in Alexandria, Va., Dec. 20, President Barbour declined a re-election, and Col. A. S. Buford was chosen in his place, with the following directors: John S. Barbour, George F. Baker, C. M. Blakeford, C. S. Brice, Joseph Bryan, William P. Clyde, R. A. Coghill, H. C. Fahnestock, C. G. Holland, J. O. Lovell, John McAnerney, J. C. Maben, George Parsons, M. H. Payne, G. S. Scott, A. D. Shepard.

PERSONAL.

—Mr. N. W. Dunn has resigned his position as Superintendent of the Nevada Central Railroad.

—Mr. D. B. Robinson, General Manager of the Mexican Central road, has returned to his duties in Mexico, his health being fully restored.

—The report that Mr. Warder Cumming had resigned his position as General Superintendent of the Texas & Pacific Railway is denied by authority. Mr. Cumming continues in charge of the road, where he has been very successful.

—Mr. Jacob Bergen Gadlis, for many years a well-known resident of Jersey City, died Dec. 18, while on a visit to his son at Ogdensburg, N. Y. Mr. Gaddis was 75 years old; some 30 years ago he was Superintendent of the New Jersey Railroad, holding that position for several years.

—Mr. James T. Harahan has resigned his position as General Manager of the Louisville & Nashville road to accept an important position on the Baltimore & Ohio. Mr. Harahan has been on the Louisville & Nashville a number of years, serving as Road-master and Division Superintendent, and was appointed General Manager a few months ago to succeed Mr. Bradford Dunham, when that gentleman went to the Baltimore & Ohio.

—Hon. John S. Barbour has retired from the office of President of the Virgina Midland Railroad Co. after many years' service. He has held the presidency through two reorganizations and during his term it has been successively the Orange & Alexandria, the Orange, Alexandria & Manassas and the Virginia Midland. It is reported that Mr. Barbour will hold an important office at Washington under the new administration.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1884.	1883.	Inc. or Dec.	P.c.
Eleven months ending Nov. 30:				
Char., Col. & A..	$693,650	$750,987	D. $57,337	7.6
Col. & Greenville.	606,311	672,327	D. 66,016	9.8
Des M. & Ft. D..	324,596	310,218	I. 14,378	4.6
Fla. Ry. & N. Co.	877,224	853,710	I 23,514	2.7
Gulf, Col. & S. F.	1,620,247	1,928,817	D. 308,570	16.0
Mexican Central.	2,659,048	.....	.....	....
Nash., C. & St. L.	2,161,170	2,118,895	I. 42,275	2.0
Net earnings...	930,980	964,121	D. 33,141	3.4
Rich. & Dan ...	3,507,014	3,510,512	D. 3,498	0.1
Texas & St. L...	914,679	.....	.....	....
Virginia Midland.	1,474,485	1,567,749	D. 93,264	5.9
Western N. C....	402,876	348,253	I. 54,923	15.7
Ten months ending Oct. 31:				
Central Pacific..	$18,666,133	$20,771,323	D. $2,105,190	10.1
Net earnings...	5,469,477	7,783,821	D. 2,314,344	29.7
Gal., H. & San. Ant.....	2,320,279	.....	.....	....
Louisiana West.	370,190	.....	.....	....
Tex. & N. Orl'ns.	691,931	.....	.....	....
Month of October:				
Central Pacific..	$2,085,637	$2,496,091	D. $410,454	16.4
Net earnings..	713,932	1,139,714	D. 425,752	37.3
Gal., Har. & San. Ant.....	335,240	.....	.....	....
Net earnings...	175,035	.....	.....	....
Louisiana West..	49,959	.....	.....	....
Net earnings..	24,154	.....	.....	....
Tex. & N. Orl'ns.	81,014	.....	.....	....
Net earnings...	38,451	.....	.....	....
Month of November:				
Char., Col & A..	$85,773	$82,021	I. $3,752	4.6
Col. & Greenville.	89,548	70,158	I. 19,390	27.7
Des M. & Ft. D..	33,734	34,117	D. 383	1.1
Fla. Ry. & N. Co.	91,187	102,829	D. 11,642	11.3
Ft. Worth & D..	36,273	43,381	D. 7,108	16.5
Net earnings..	18,979	26,878	D. 7,899	29.2
Georgia Pacific..	72,406	51,191	I. 21,215	41.6
Gulf, Col. & S. F.	158,952	236,925	D. 77,973	32.9
Mexican Cent...	273,814	.....	.....	....
Nash., C. & St. L.	196,001	205,660	D. 9,659	4.7
Net earnings..	82,356	91,378	D. 9,022	9.9
Rich. & Dan.....	371,276	363,704	I. 7,572	2.1
Texas & St. L...	132,904	114,113	I. 18,791	16.5
Va. Midland.....	122,715	147,046	D. 24,331	16.6
Western N. C....	40,218	36,132	I. 4,086	11.3
Second week in December:				
Chi. & Alton....	$175,633	$200,042	D. $24,409	12.2
Chi. & East. Ill..	29,563	32,200	D. 2,634	8.2
Chi., Mil. & St. P.	519,000	511,315	I. 7,685	1.5
Chi. & Nor'west.	448,878	411,714	I. 37,164	9.0
Chi., St. P., Min. & O.....	112,300	116,700	D. 4,400	3.8
Cin., I., St. L. & Chi.....	46,340	40,110	I. 6,230	15.5
Denver & R. G ..	94,957	130,901	D. 35,944	27.4
Long Island.....	41,009	39,682	I. 1,327	4.4
Louisv. & Nashv.	306,950	302,475	I. 4,475	1.4
Mil., L. S. & W..	21,125	19,450	I. 1,675	8.6
Mil. & Northern.	9,340	9,300	I. 40	0.4
Roch. & Pitts....	23,407	20,116	I. 3,291	16.4
St. L. & San F..	85,200	95,400	D. 10,200	10.7

Weekly earnings are usually estimated in part, and are subject to correction by later statements.

Grain Movement.

For the week ending Dec. 13 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eleven years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic. receipts.
1874	1,872,271	562,345	1,338,420
1875	2,231,724	788,772	1,395,791
1876	2,711,045	1,168,217	1,841,227
1877	3,219,829	1,377,864	3,228,910
1878	2,972,744	1,599,045	3,143,021
1879	3,640,974	1,261,537	3,473,439
1880	5,012,357	1,437,618	3,212,258
1881	3,524,829	1,713,134	2,161,922
1882	4,658,829	1,888,188	2,560,117
1883	5,778,577	2,406,499	2,358,386
1884	6,012,208	2,981,086	2,596,945

Thus the receipts of the week this year were larger than

in the corresponding week of any previous year, though a million bushels less than in the previous week of this year.

The shipments were decidedly larger than in any previous year. Those going down the Mississippi were 333,545 bushels, which is much more than usual. The receipts at Atlantic ports were larger than in any corresponding week since 1880, but less than in any of the four years from 1877 to 1880. They were 587,000 bushels less than in the previous week of this year.

The receipts at St. Louis were the largest, with one exception, of the year 1884.

The receipts at New York, which during November averaged 2,724,712 per week, were but 916,145 bushels in the second week of December.

The exports for this week to Dec. 13 have been :

	1880.	1881.	1882.	1883.	1884.
Flour, bbls....	178,138	86 059	269,316	212.726	180,304
Grain, bu	2,679,170	1,193,923	2,308,272	1,652,980	1,773,691

The exports were very like what they have been for some weeks.

Coal.

Coal tonnages for the week ending Dec. 13 are reported as follows:

	1884.	1883.	Inc. or Dec.	P.c
Anthracite.....	696,219	419,641	I. 276,578	6 6
Eastern bituminous	177,648	168,964	I. 8,684	5.1
Coke	56,429	58,840	D. 2,411	4.1

At a meeting of representatives of the anthracite coal companies in Philadelphia, Dec. 19, all the companies were represented. After some discussion the following resolutions were adopted :

"*Resolved*, That it is the judgment of this meeting that for the future the total output of anthracite coal required or taken by the market should be divided among all interests in proper monthly or yearly quotas.

"*Resolved*, That a committee of three be appointed by the Chair to prepare and present at an adjourned meeting a plan for such distribution, with the proper quotas to be allotted to each interest.

"*Resolved*, That each interest be required to prepare and submit to said committee its claim for quotas, with such other suggestions as it may desire to present for the consideration of the commiteee."

Messrs. Hoyt, of the Pennsylvania Coal Co.; Harris, of the Lehigh Coal and Navigation Co.; and Gowen, of the Philadelphia & Reading Co., were appointed the committee to prepare a plan of distribution and the proper quotas to be allotted to each company. The representative of the Pennsylvania Railroad Co. stated that his company agreed to the resolutions, with the express understanding that there should be no moral or legal obligations on them arising from such assent The Pennsylvania Railroad Co., although its anthracite trade has been growing steadily, ships most of it westward, sending very little to tidewater.

Cumberland coal shipments for the week ending Dec. 20 were 33,707 tons; total for the year to Dec. 20, 1884, 2,862,302; 1883, 2,449,765 tons; increase, 352,537 tons, or 14.4 per cent.

The contract for the anthracite coal supply for the Manhattan Elevated lines in New York (whose locomotives burn anthracite exclusively) has been taken by the Lehigh Valley Co. for the coming year at $3.04 per ton.

The coal tonnage of the Pennsylvania Railroad for the week ending Dec. 13 was :

	Coal.	Coke.	Total.	1883.
Line of road.... ..	153,626	54,452	208,078	195,901
From other lines...	83,689	1,977	85,666	74,905
Total	237,315	56,429	293,744	270,806
Year to Dec. 13...	9,958,733	2,728,853	12,687,586	11,889,345

Increase for the week, 22,938 tons, or 8.5 per cent. ; for the year, 898,241 tons, or 6.7 per cent.

Cotton.

Cotton movement for the week ending Dec. 19 is reported as follows, in bales:

Interior markets:	1884.	1883.	Inc. or Dec.	P.c.
Receipts	134,653	134,343	I. 310	0.2
Shipments.....	106,238	121,012	D. 14.774	12.2
Stock, Dec. 19.	363,866	423,577	D. 59,711	14.1
Seaports:				
Receipts.	258,340	247.733	I. 10,607	4.3
Exports.....	177,593	150,776	I. 16,817	11.1
Stock, Dec. 19.....	1,015,403	1,242,411	D. 227,008	18.3

The total movement from plantations for the cotton year (from Sept. 1) to Dec. 19 is estimated at 3,982,054 bales; the increase, as compared with last year, is 44,717 bales, as compared with 1882 is 117,899 bales, and with 1881 is 247,056 bales.

Lackawanna Line.

The following circular is dated Buffalo, N. Y., Dec. 13:

"Below please find numbers and initials of cars in this line:

Boston, Barre & Gardner..	500 to	599 inc.	34 ft.—40,000 lbs.
Delaware, Lackawanna & Western.....	1,000 "	1,999 "	34 ft.—40,000 lbs.
Delaware & Hudson Canal Co.....	3,200 "	3,299 "	34 ft.—40,000 lbs.
Wheeling & Lake Erie.....	4,000 "	4,099 "	
Peoria, Decatur & Evansville..	4,500 "	4,699 "	34 ft.—30,000 lbs.
Fitchburg R. R.....	8,000 "	8.199 "	34 ft.—40,000 lbs.
Philadelphia & Reading...	8,500 "	8,699 "	34 ft.—40,000 lbs.
Chicago & Northwestern..	9,550 "	9,799 "	34 ft.—40,000 lbs.
New York, Chicago & St. Louis	22,000 "	22,999 "	34 ft.—40,000 lbs.

Peoria, Decatur & Evansville (Tiffany Refrigerator Cars), 10,100 to 10,499 inclusive.

"The movements of these cars should be reported to C. W. Cushman, Manager the Railway Car Association, Buffalo, N. Y.

"The mileage account, report and settle direct with owners, a separate item from their common cars, except the Tiffany refrigerator cars, which report to and settle with W. H. Smith, Manager, as a separate item."

Southern Railway & Steamship Association.

A meeting of this association was held in Chattanooga, Tenn., Dec. 13, to consider the cutting of rates on freight to interior southern points by way of Cincinnati and Louisville. The meeting lasted two days, and was not at all harmonious, the Cincinnati, New Orleans & Texas Pacific, the Louisville & Nashville and the East Tennessee roads refusing to make any concessions for the sake of a settlement. Finally, the association, without reaching any conclusion, adjourned subject to the call of the President. It is understood that a meeting will be called in January. Meantime the cutting of rates continues.

Transcontinental Association.

The meeting in Chicago last week closed on Thursday with an agreement that matters should remain in their present condition and rates should be maintained until the next meeting. Finally the association decided that when it adjourned, it would be until Jan. 12, 1885, at San Francisco, and that Mr. L. G. Cannon, Auditor of the association, should act as Commissioner until a permanent successor was elected in Mr. Ristine's place.

Rates to El Paso.

Rates to El Paso, Tex., from New York and eastern points have been in an unsettled condition for some time, and the cutting has extended to points in New Mexico and Arizona. Freight has been taken to El Paso as low as 50 cents per 100 lbs. by steamer from New York to New Orleans, and thence by the Galveston, Harrisburg & San Antonio road.

New Hampshire Rates.

According to previous notice, the New Hampshire Railroad Commissioners on Dec. 22 began a series of hearings required by law to fix the maximum tariff of fares and freights. The Boston & Lowell was the first road to come under consideration, and it was represented by General Superintendent Mellen, Master of Transportation Turner, General Ticket Agent Kendrick, and Attorney Burns.

Other roads will be taken up in the order as notified. It is not expected that a decision will be reached for some weeks.

Southwestern Railway Association.

The annual meeting of the Southwestern Railway Association was held at Commissioner Midgley's office in Chicago, Dec. 18. The Commissioner presented a statement of the business done during the past year, also a series of recommendations for the reorganization of the association for the coming year. These recommendations referred principally to territorial questions, a prominent one being the admission of the Missouri Pacific road into competition for Chicago business. These recommendations were referred to a committee consisting of Messrs. E. C. Ripley, W. M. Sage, H. H. Courtright, George Olds, and James Smith. The following Executive Committee was chosen : Messrs. T. J. Potter, R. R. Cable, A. A. Tallmage, H. M. Hoxie, and C. H. Chappell. Mr. Potter was elected Chairman in place of Mr. R. R. Cable, who has filled that position for three successive years. The request of the Chicago shippers and Board of Trade for reduced grain rates was refused.

OLD AND NEW ROADS.

Alabama Great Southern.—At a special meeting held in Birmingham, Ala., Dec. 15, the stockholders voted to authorize the issue of $1,000,000 additional stock, to be sold for the purpose of completing the renewal of the road with steel rails.

Allegheny Valley.—The Receivers have asked the Court for authority to pay the coupons due Jan. 1 on the first-mortgage bonds. The amount of the coupons is $146,000, and they represent that they have a surplus of $241,772 on hand. The order will doubtless be granted.

Baltimore & Ohio.—Track on the Philadelphia Branch has recently been laid from Newark, Del., west to the Maryland line, three miles. Tracklaying is in progress at several points in Delaware, the intention being to have the rails down this week on all of the 20 miles through the state. The high bridge over the Brandywine at Wilmington is completed and locomotives have crossed it.

Carolina Seaboard.—This company asks for a charter to build a railroad from Charleston, S. C., to Wilmington, N. C., running parallel with the coast.

California Southern.—The Boston *Advertiser* of Dec 23 says: "The holders of about $2,800,000 of the bonds of the California Southern have assented to the reorganization proposed by the Atchison, Topeka & Santa Fe, which involves the extension of the road to the Atlantic & Pacific's Mojave Division and the issuing of new bonds secured upon the entire road when thus extended. Nearly $2,500,000 of the bonds have been deposited with the trustees. The holders of about $100,000, however, seem unwilling to come into the arrangement, and it is reported that they have obtained the opinion of eminent counsel that the stockholders can, under the laws of California, be sued for any default in the bonds, though the bonds upon their face distinctly waive any claims upon the personal liability of the shareholders."

Central Pacific.—This company's statement for October and the ten months to Oct. 31 is as follows :

	October.		Ten months.	
	1884.	1883.	1884.	1883.
Earnings.....	$2,085,637	$2,496,091	$18,666,133	$20,771,323
Expenses.....	1,371,675	1,356,377	13,196,656	12,987,702
Net earnings.	$713,962	$1,139,714	$5,469,477	$7,783,821
Per cent. of ex.	65.8	54.3	70.7	62.5

For October the decrease was $410,454, or 16.4 per cent, in gross earnings and $425,752, or 37.3 per cent., in net earnings. For the ten months the decrease in gross earnings was $2,105,190, or 10.1 per cent.; in net earnings, $2,314,244, or 29.7 per cent.

Chicago, Burlington & Quincy.—This company has let a contract for grading 28 miles of new road from Fontanelle, Ia., northwest, to Mr. Fitzgerald, of Lincoln, Neb. This is a section of the line recently surveyed by the company from Fontanelle to Council Bluffs.

Chicago, Milwaukee & St. Paul.—A Milwaukee dispatch says : "Preliminary surveys have been made looking to the construction of a magnificent iron bridge across the Mississippi River between North McGregor, Ia., and Prairie du Chien, Wis. The bridge, if built, will be nearly a mile long, and will be a part of the St. Paul Railway system, although it will not be owned by that corporation. It will take the place of the pontoon bridge now in use at that place, which is owned by John Lawlor. The new bridge will be built by a stock company, headed by Mr. Lawlor, and will cost from $800,000 to $1,000,000. Mr. Lawlor has made a fortune out of his pontoon bridge, his annual income from the St. Paul ranging from $35,000 to $50,000."

Chicago, Rock Island & Pacific.—It is understood that the $1,500,000 new first mortgage extension bonds offered by this company have been taken at 104 by one banking house, which bid for the whole lot. The offers received were nearly ten times the amount required, ranging from par to 104.

Chicago, Union Central & Atlantic.—This company has filed articles of incorporation in Indiana to build a railroad from the Illinois line in Lake County, south by east to the Ohio River in Switzerland County. It is part of a projected line from Chicago to Charleston, S. C., which is not likely to get beyond the paper stage.

Denver, New Orleans & Missouri Pacific.—This company has been organized to build a railroad from Wichita, Kan., west to Trinidad, Col., where it is proposed to connect with the extension of the Denver & New Orleans road.

East Tennessee, Virginia & Georgia.—At a meeting of the board in New York last week the question of paying the January coupons on the consolidated bonds was referred to a special committee, which is to report to an adjourned meeting this week.

Fremont, Elkhorn & Missouri Valley.—The contract for grading the extension of this road from Valentine, Neb., west 90 miles has been completed by O'Hara Brothers. An additional 50 miles has been let, as noted last week. Tracklaying will not be begun until April next, when arrangements will be made to put down the rails rapidly. The grading and bridging on the 140 miles is comparatively light.

Galveston, Sabine & St. Louis.—The track on this road is now laid to Martin's Creek, in Panola County, Tex., 25 miles southward from Longview, the starting point. Tracklaying has ceased for the season, although grading will be continued. There are some heavy cuts south of Martin's Creek, which it will take some time to complete.

Grand Trunk.—This company's statement for October and the four months from July 1 to Oct. 31 is as follows:

	October.		Four months.	
	1884.	1883.	1884.	1883.
Earnings.....	£335,861	£375,688	£1,255.669	£1,377.581
Expenses..... ...	231,550	239,819	887,888	914,040
Net earnings....	£104,311	£135.869	£367,781	£463,541
Per cent. of exps.	68.9	63 8	70.7	66.3

For the four months the decrease in gross earnings was £121,912, or 8.8 per cent.; in net earnings, £95,760, or 20.6 per cent.

For the four months the earnings of the controlled lines west of Detroit were :

	Chi. & G. T.		Det , G. H. & M.	
	1884.	1883.	1884.	1883.
Earnings	£222,184	£211.757	£99.574	£104,881
Expenses.....	167,085	157,564	64,535	68 387
Net earnings.....	£55,099	£54,193	£35,039	£36,494
Per cent. of exps..	75.3	74.1	64.6	65.1

The Chicago & Grand Trunk shows an increase of £10,427, or 5 per cent., in gross and of £906, or 1.7 per cent., in net earnings. The Detroit, Grand Haven & Milwaukee had a decrease in gross earnings of £5,307, or 5.1 per cent., and in net earnings of £1,455, or 4 per cent.

Houston, East & West Texas.—The line of this road as surveyed from Houston, Tex., to Shreveport, La., is 229 miles. Of this, 152 miles, from Houston to Sterne, is now completed and in operation. From Sterne to Logansport, La., 38 miles, most of the grading is done and work is progressing well, leaving but little to be done except on the bridge over the Sabine at Logansport. From that place to Keachi, 16 miles, grading is in progress, and thence to Shreveport, 23 miles, it is all finished, and eight miles of track down. Tracklaying will be resumed when the rails are received, and the present expectation is that trains will run from Houston to Shreveport in March.

Lake Shore & Michigan Southern.—The following statement is made for the year ending Dec. 31, the December earnings estimated :

	1884.	1883.	Inc. or Dec	P. c.
Earnings.....	$14,902,000	$18,513,656	D. $3,611.656	19.5
Expenses....	9,160,500	11,001,853	D. 1.841,353	16.7
Net earn...	$5,741,500	$7,511,803	D. $1,770,303	23.6
Charges... .	3,753,611	3,498,706	I. 254,905	7.3
Surplus....	$1,986,889	$4,013,097	D. $2,025,208	50.5

The working expenses are 61.45 per cent., against 60.67 in 1883. The surplus for the year is 4.02 per cent. on the stock, against 8.11 in 1883. The dividends paid this year have been one of 2 and two of 1½ per cent., 5 per cent. in all. The Treasurer's statement says:

"In the statement issued upon the declaration of the dividend payable Aug. 1 last the belief was expressed that although the first half of the year showed a deficiency, the second half would make it good, such having been the case in preceding years. But it was, nevertheless, deemed judicious to reduce the rate of dividend to 6 per cent.

"The conditions that affected the first half of the year have continued, however, and with increased intensity during the second, so that, even with the reduced dividend, the looked for effect for the year has not been realized.

"Under the circumstances the directors have decided not to declare a dividend for the quarter ending with the 31st inst.

"While the utmost practical economy has been put in operation in all departments, the road, equipment and property have been fully maintained.

"No part of any premium on bonds sold is included in the earnings above stated."

Louisville & Nashville.—In the New York Supreme Court last week a verdict of $32,100 was given against this company in the suit brought by the Gallatin National Bank to recover damages for the failure to deliver to it $250,000 Owensboro & Nashville bonds for which it had subscribed. The Nashville, Chattanooga & St. Louis Co. began to build the road in question as an outlet for its own line, but when the Louisville & Nashville acquired control of that company, the building of the Owensboro line was abandoned and the bonds were not issued. The Louisville & Nashville at that time assumed all liabilities on account of the new line.

The announcement comes from the office of this company to the effect that the company sold the 50,000 shares of stock in its treasury, of which the sale was authorized at the stockholders' meeting on Oct. 1. Of the $5,000,000 6 per cent. 10-40 adjustment mortgage bonds, $1,860,000 had been taken, the balance, $3,140,000 remaining in the treasury. It will be remembered that the company offered the stock at 26 and the bonds at 66, realizing, therefore, about $2,500,000 in money.

Marquette, Houghton & Ontonagon.—The total iron ore tonnage of this road for the season of 1884 was 764,459 tons, of which 732,251 were for shipment by lake and 32,208 tons were delivered to local furnaces. The road carried for the season 5,407 tons of pig iron from the furnaces.

Memphis & Charleston.—Messrs. A. Iselin & Co., of No. 48 Wall street, New York, give notice that they will purchase this company's second-mortgage bonds due Jan. 1 next up to Jan. 2, 1885, at 101 and accrued interest. There are $1,000,000 of these bonds outstanding.

Mexican Central.—A circular has been issued from the Boston office of this company, which says:

"The cost of the main line and equipment exceeded the money raised for that purpose about 10 per cent., the amount of the deficiency being over $3,000,000.

"The entire unfunded indebtedness of the company is as follows:

Collateral trust notes and interest on same, due in February next	$1,150,000
Floating indebtedness.....	1,000,000
	$2,150,000

"The company has the following surplus assets:

First mortgage bonds (exclusive of guarantee of $300,000 deposited in Mexico).....	$6,075.000
Income bonds	811,000
Stock	3,145,100
Subsidy certificates earned of the Mexican government, now on hand and in process of immediate delivery, over.....	16,000,000

"Of the latter there have been pledged as security for the 10 per cent. coupon notes given to the first-mortgage bondholders, $5,760,000, being 150 per cent. of said notes, leaving over $10,000,000 of said certificates unpledged.

"The increasing business of the company will soon render necessary more equipment, additional buildings and other improvements.

"To take up all the unfunded indebtedness and for the general purposes of the company, the directors have decided to offer a subscription, as specified below, to the stockholders; each stockholder of record, Dec. 22, 1884, having the unassignable right to subscribe for one block, and assignable rights to subscribe for one additional block under this circular for each 100 shares standing in his name.

"The company will issue debentures of $1,000 each, dated Jan. 1, 1885, bearing interest from and after April 1, 1885, at 10 per cent. per annum, payable semi-annually Oct. 1 and April 1 of each year, as per coupons annexed. These debentures will be payable April 1, 1895, but redeemable at par and accrued interest on and after April 1, 1890, at the company's option, upon 30 days' notice by public advertisement. The debentures will be secured by deposit with the Boston Safe Deposit & Trust Co., trustee, under an indenture made for the purpose, of the following collateral: For each $1,000 debenture, $1,000 first-mortgage bonds, with all unpaid coupons, $2,000 subsidy certificates.

"The directors expect to raise $2,700,000 under this circular, and, if their expectations are met, all floating indebtedness will be paid, and the company will have in its treasury over $500,000 cash, $3,000,000 first mortgage bonds, $200,000 income bonds, $1,000,000 stock, and $4,000,000 subsidy certificates.

"The present monthly receipts from net earnings and subsidy collections will meet all the interest which will fall due in 1885, including the next coupon on the first mortgage bonds, and all other interest due Jan. 1, 1886.

"It is believed that these receipts in 1885 will be much greater than at present, and there is reason to expect such development of business that from and after Jan 1, 1886, the net earnings and subsidy will pay the full interest of all the company's obligations."

The company, therefore, offers to deliver $1,000 in the new debentures, $200 in income bonds and $700 in stock for each subscription of $900; payment to be made in five equal monthly installments, beginning with Jan. 20. All subscriptions must be sent in by Jan. 7, and any amount of the debentures not then taken will be disposed of as the board may direct.

Michigan Central.—The following statement is made for the year ending Dec. 31, the December earnings estimated:

	1884.	1883.	Inc. or Dec.	P c.
Earnings	$11,721,000	$14,000,000	D. $2,279,000	16 4
Expenses	9,001,000	9,700,000	D. 699,000	6.2
Net earnings	$2,720,000	$4,300,000	D. $1,580,000	36.7
Interest	2,640,000	2,475,000	I. 165,000	6.6
Surplus	$80,000	$1,825,000	D. $1,745,000	95.6

Of this surplus two-thirds, or $53,333 is apportioned to the Michigan Central, and one-third, or $26,667 to the Canada Southern.

Nashville, Chattanooga & St. Louis.—The statement for November and the five months of the fiscal year from July 1 to Nov. 30, is as follows:

	November		Five months.	
	1884.	1883.	1884.	1883.
Earnings	$196,001	$205,660	$1,015,989	$1,010,906
Expenses	113,645	114,282	576,109	533,537
Net earnings	$82,356	$91,378	$439,880	$483,369
Interest and taxes			285,842	276,361
Surplus			$154,038	$207,008

The decrease in gross earnings was $917, or 0.1 per cent. in net earnings $43,489, or 9.0 per cent., and in surplus $52,970, or 25.6 per cent., for the four months.

New Jersey Railroad Taxation.—In Trenton, N. J., Dec. 22, the argument of the Pennsylvania Railroad Co. was presented against the valuation fixed by the Commissioners of Railroad Taxation. It was stated that while the road objected to the tax on the franchise, for the purpose of appeal they would assume that the franchise was taxable. The company contended that there were two kinds of franchises—the first, that of eminent domain, and the second, the right to receive toll. As to the first, the railroad admitted that while it might be taxable, the assessment was largely in excess of the true value, and that the Constitution provided that property should be assessed according to its true value. As to the second point, the railroad claimed that the passage of the general railroad law had impaired the value of the franchise held by the United New Jersey Co. by taking away the monopoly it had previously held of carrying passengers across the state.

Norfolk & Virginia Beach.—On application of the creditors the City Court of Norfolk, Va., has appointed receivers for this company, which last year built a railroad from Norfolk to the ocean shore below Cape Henry, with a large hotel at the terminus of the road.

Northern Central.—The Philadelphia *Ledger* says: "The Pennsylvania Railroad Engineering Department is at work making some improvements on the terminals at Baltimore. We are informed by Mr. George C. Wilkins, the General Agent of the Northern Central Railway, that the company's warehouses and freight yards at its Calvert Station, in Baltimore, having become inadequate to the proper and economical handling of its largely-increased business, the company purchased several valuable pieces of property adjoining its tracks on North street, and a system of improvements was projected last spring, making a new line from the west side of Jones' Falls, which is rapidly approaching completion, leaving the old line on the east bank of the Falls at a point where Chase street crosses the tracks on an overhead bridge. The stream is crossed by a three-track iron bridge, and the line continued thence passing under the grade of Eager street, and joining the present system of tracks at North and Madison streets. This change of line avoids the sharp curvature of the old crossing of Jones' Falls, in the vicinity of Madison street, and gives an admirable approach for passenger trains to Calvert Station, and at the same time develops the company's property on the west bank of the Falls. It is proposed to remove the old bridge crossing Jones' Falls, using all the tracks on the east bank for freight purposes. An interlocking signal tower, with levers, is being erected at the junction of the passenger and freight tracks near Chase street, to protect the many trains converging at this point, at which the Western Maryland Railroad trains from Hulen Station also enter upon the main tracks of the Northern Central Railway. Between North street and Jones' Falls two large freight warehouses 500 ft. long are under construction, running from Madison to Monument streets—one for in-bound freight, 55 ft. wide; the other for out-bound freight, 35 ft. wide. It is expected that these improvements will be completed by the end of the current year, and at a cost of about $125,000, and they will afford to shippers and receivers of freight facilities equal, if not superior, to those given by any other railroad in the city of Baltimore."

Ohio Central.—The Central Trust Co. has obtained a decree against the Ohio Central main line which orders the payment within 30 days of two installments of interest on the first-mortgage bonds, being $180,000, together with expenses. In default of such payment the road will be sold within 60 days after the default. A decree was also entered against the terminal property, but none against the River Division.

Oregon & California.—At the special meeting in Portland, Or., Dec. 22, the stockholders voted to authorize the issue of additional stock as proposed by the board, under the contract to complete the road. They also authorized the board to negotiate for the sale or lease of the road to the Central Pacific Co. on the best possible terms.

Oregon Improvement Co.—This company's earnings for October and the eleven months of its fiscal year from Dec. 1 to Oct. 31 were:

	October.		Eleven months.	
	1884.	1883.	1884.	1883.
Earnings	$333,448	$439,914	$3,109,821	$3,705,109
Expenses	222,057	258,509	2,403,382	2,510,985
Net earnings	$111,391	$181,405	$706,439	$1,194,124

The sources from which the earnings were derived in October were: Railroad, $29,093 gross and $19,896 net; steamships, $203,738 gross and $60,655 net; lands, coal, etc., $100,615 gross and $34,840 net.

Pennsylvania.—It is understood that negotiations are in progress for a renewal of the contract between this company and Pullman's Palace Car Co. The old contract will expire before long, but a new one will probably be made, with some material changes from the old agreement.

Philadelphia & Reading.—The Philadelphia *Ledger* of Dec. 23 says: "The chief intelligence yesterday in financial circles was the development that the movement, which has for some time been going on among the Reading Railroad general mortgage bondholders for the protection of their interests as creditors of the company, had finally crystallized into form. The bonds issued under the Reading general mortgage amount to nearly $25,000,000, and they are mainly held in London, New York and Philadelphia. Their lien upon the company is immediately subsequent to that of the consolidated and improvement mortgages. Five millions of the generals bear 7 per cent. interest and the remainder 6 per cent., and the next coupon is due Jan. 1. Now, that the Reading management has quieted the claims of its creditors in the Vanderbilt interest, the next debt of importance to be met is the general mortgage interest, and this, the current belief is, the Receivers are not at present prepared to pay. We are informed that yesterday the banks, trust companies and other large holders of the general mortgage bonds, in anticipation of a default upon this interest in whole or in part on Jan. 1, agreed upon the policy of appointing an advisory committee to take care of their interests and to supervise from their standpoint as creditors whatever may be done or proposed to be done hereafter for the rehabilitation of the Reading finances. We understand that in the selection of this committe the object in view goes somewhat beyond the protection of the general mortgage bondholders' interest solely, and that some other interests are included, notably the Vanderbilts, so that, if possible, a harmonious plan may be arrived at for the company's reorganization. The interests represented are also desirous of having a voice in the Reading receivership, and with this object will propose Mr. Joseph Wharton, a large holder of general mortgage bonds, for the existing vacancy. They may also suggest a representation in the directory. When their representative committee is made up it will be found to be the strongest committee yet created to deal with the unfortunate finances of the Reading Co., and including just the elements that are necessary for successful dealing with the problem of its reorganization, in a spirit friendly to the interests of the Reading Co., yet at the same time not unjust to its creditors."

Pine Bluff, Monroe & New Orleans.—This company has filed articles of association with the Secretary of State of Arkansas. As projected, the road will commence at Pine Bluff, Ark., and run directly south through Jefferson, Lincoln, Baxter, Drew, Chicot, and Ashley counties, intersecting with the Vicksburg, Shreveport & Pacific road at Monroe, La., thence to New Orleans.

Union Pacific.—President Adams has made a special report to the board for the quarter ending Sept. 30, which says: "Sept. 30 closed the first complete railroad quarter which followed the change of administration brought about by the resignation of President Dillon. I have accordingly caused the following statement, showing the financial results of that quarter, to be prepared, as also a statement for the corresponding quarter of the previous year. As will be seen, the balance of surplus income of the three months, after payment of all fixed charges, including Government requirements and taxes, was $1,602,398, a sum equivalent to 2.6 per cent. upon the capital stock of the company. It should be remembered that the third quarter is generally the most profitable quarter of the year:

	1883.	1884.
Earnings (excluding St. Jo. & West)	$7,850,076	$7,317,770
Expenses and taxes	4,109,460	3,412,015
Surplus earnings, entire system	$3,740,616	$3,905,755
Income from investments outside the system	70,260	47,002
Total income	$3,810,876	$3,952,757
Interest on bonds	1,333,282	$1,342,146
Discount and interest	34,945	71,012
Losses on securities, premiums, etc	23,030	7,346
Company's S. F. requirements, sink-fund bonds	133,000	133,000
Interest on sundry bonds of operated roads	264,476	310,472
Total expenditures	$1,788,732	$1,863,977
Surplus	$2,022,041	$2,088,779
Less United States requirements	549,300	486,381
Net surplus income	$1,472,840	$1,602,398

The following is a condensed statement of the financial results of the first nine months of the year (Jan. 1 to Oct. 1), as compared with the same months of the previous year:

	1883.	1884.
Earnings (excluding St. Jo. & West.) and income from investments	$21,082,680	$18,504,170
Expenses and taxes (excluding St. Jo. & W.)	10,953,130	10,361,537
Income over expenses and taxes	$10,129,549	$7,732,632
Expenditures: Interest, discount, losses on securities, sinking fund, etc	5,187,741	5,682,215
Surplus income	$4,941,808	$2,050,416
United States requirements	1,493,244	858,018
Balance	$3,448,563	$1,192,397

	1883.	1884.
Balance brought forward	$3,448,563	$1,192,397
Add received from Trustees K. P. consolidated mortgage	225,000	400,000
Total surplus income	$3,673,563	$1,592,397
Dividends declared during period specified	3,195,591	1,065,197
Balance to income account	$477,972	$527,200

The balance sheet of the company Sept. 30, differs very little from that of June 30, except the items of "land contracts, cash, etc.," which had been increased Sept. 30 by $2,218,987, and the item of bills payable, which had decreased $1,421,754, and these items were balanced on the other side by an increase in profit and loss.

"Owing to the payment made in June to the United States on account of requirements under the Thurman Act ($718,814); notes then given in settlement of certain long-pending litigations against the company ($331,000); and notes given for sleeping-car equipment, purchased under the contract of May 1, 1884, with the Pullman Car Co. ($400,000); in all $1,449,814; the net floating debt of the company had, on June 30, considerably increased over its amount at the close of the previous quarter (March 31). It was decreased during the quarter ending Sept. 30 at an average rate of about $600,000 a month, as appears from the following comparative statement:

Liabilities.	June 30.	Sept. 30.
Bills payable	$7,205,533	$5,783,778
Accounts payable	2,542,423	2,900,175
Pay-rolls and vouchers	1,969,996	1,909,972
Dividends unpaid	83,884	79,366
Coupons due and unpaid	1,276,182	535,522
Called bonds	32,000	32,000
Totals	$13,110,020	$11,240,815
Assets.		
Cash	$1,192,070	$825,237
Company stocks and bonds	2,072,353	2,091,739
Sinking funds in hands of trustees	32,000	32,000
Bills and accounts receivable	2,913,419	3,154,828
Totals	$6,209,842	$6,103,806
Net debt	$6,900,177	$5,137,009

"About the same rate of decrease ($600,000 per month) was continued through October and November. An equally rapid rate of decrease is not to be expected during the winter months.

"During the quarter ending Sept. 30, the sum of $488,059 was charged to construction, of which $416,143 was spent on extensions represented by additional mileage. All of this expenditure was met out of earnings, no bonds or other securities having been sold.

"The Oregon Short Line was connected with the Baker City extension of the Oregon Railway & Navigation Co. on Nov. 15, and opened for traffic on Dec. 1. No reports as to the amount of business at present being done over this route have yet been received. Meanwhile, an equal division of all competitive traffic, to and fro, between the East and points reached by the Oregon Railway & Navigation Co. has been agreed upon between the Union and the Northern Pacific. All danger of rate complications in consequence of the opening of a new trans-continental route has thus been averted. * * *

"During the present month the suit between the United States and the Union Pacific Railway Co., involving all the issues arising out of the construction of the Thurman Act, has been before the Court of Claims. The argument was closed Dec. 11. The case is now in the hands of the Court, and an early decision will undoubtedly be reached. It is confidently believed that a complete settlement between the United States and the company under the requirements of the Thurman Act will soon be effected. * * *

"The purchase of $1,049,000 of the Union Pacific land grant bonds has recently been effected. These bonds will be sold to the trustee under the mortgage, and the company will in future be relieved from payment of interest thereon, thereby effecting an annual reduction of fixed charges of $73,430.

"Of the entire original issue of subordinated income bonds of the Kansas Pacific Railway Co., $715,750 were outstanding when the last annual report of the company was published. This issue of bonds has for many years been a source of litigation. Of the above amount, $455,700 have been purchased at a total cost of $342,519 since the first of July, and are now in possession of the company. Apart from the operation of the regular sinking funds, the net aggregate reduction of funded debt effected since July 1, is $1,504,700; making a total debt reduction of $3,287,868 ($1,504,700 funded, $1,763,168 floating debt), in addition to that effected through the payment of floating debt in October and November, the exact amount of which cannot be ascertained until the books are closed on the last day of the present month."

Mr. Adams recommends that the proceeds of Kansas Pacific land sales be applied as a sinking fund to the purchase and retirement of the Kansas Pacific consolidated mortgage bonds, instead of to the payment of interest on those bonds. He says: "Action to this effect should be taken, if taken at all, by the full board of directors. The Executive Committee have, therefore, caused a suitable supplementary contract of the nature indicated to be prepared, which is herewith submitted. Should it receive the approval of the directors, it will practically convert the bonds issued under the consolidated Kansas Pacific mortgage into land-grant sinking fund bonds; as there now remains some 4,000,000 acres of the Kansas Pacific land grant unsold, besides outstanding contracts for lands already sold to the amount of $2,794,579, the ultimate extinguishment of these bonds before maturity will in great part be provided for."

Virginia Midland.—At the first meeting of the new board a committee of five directors was appointed to consider the expediency of creating a general mortgage to secure an issue of 5 per cent. bonds for an amount not exceeding $12,500,000, to secure and provide for the entire bonded obligations of the company, including its income bonds. If, in the opinion of the committee, this is deemed expedient, they will report to a meeting of the stockholders to be called by the President.

Wabash, St. Louis & Pacific.—Reports are current of a traffic agreement between this company and the Canadian Pacific, which involves the extension of that company's Credit Valley line from St. Thomas to Detroit.

Stockholders of the Quincy, Missouri & Pacific Co. have filed a petition with the Court asking that their road be relieved of all connection with the Wabash Co. They charge that the agreement under which the road was transferred to the Wabash has not been complied with, and ask that it be abrogated altogether and the road restored to their control.

Wisconsin Central.—Track on this company's new extension to St. Paul is now laid to the junction with the St. Paul & Duluth road near St. Paul, Minn., 19 miles from the St. Croix River and 99 miles from the starting point of the extension at Chippewa Falls, Wis. The company's trains will enter St. Paul on the St. Paul & Duluth track, and it has secured by contract the use of the terminal facilities of that road and the St. Paul, Minneapolis & Manitoba. The company will begin to run regular trains over its new line early in January.